# Service Manual

# ViewSonic VX1945wm-3

## Model No. VS11444

## 19” Color TFT LCD Display

(VX1945wm-3_SM Rev. 1a Nov. 2006)

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# Revision History

| Revision | SM Editing Date | ECR Number | Description of Changes | Editor |
|---|---|---|---|---|
| 1a | 11/7/2006 | | Initial Release | Jamie Chang |
| | | | | |
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# 1. Precautions and Safety Notices

## 1. SAFETY PRECAUTIONS

This monitor is manufactured and tested on a ground principle that a user's safety comes first. However, improper used or installation may cause damage to the monitor as well as to the user.

**WARNINGS:**

- This monitor should be operated only at the correct power sources indicated on the label on the rear of the monitor. If you're unsure of the power supply in you residence, consult your local dealer or Power Company.
- Use only the special power adapter that comes with this monitor for power input.
- Do not try to repair the monitor by yourself, as it contains no user-serviceable parts. Only the qualified technician can repair it.
- Do not remove the monitor cabinet. There are high-voltage parts inside that may cause electric shock to human bodies.
- Stop using the monitor if the cabinet is damaged. Have it checked by a service technician.
- Put your monitor only in a lean, cool, dry environment. If it gets wet, unplug the power cable immediately and consult your closed dealer.
- Always unplug the monitor before cleaning it. Clean the cabinet with a clean, dry cloth. Apply non-ammonia based cleaner onto the cloth, not directly onto the glass screen.
- Do not place heavy objects on the monitor or power cord.

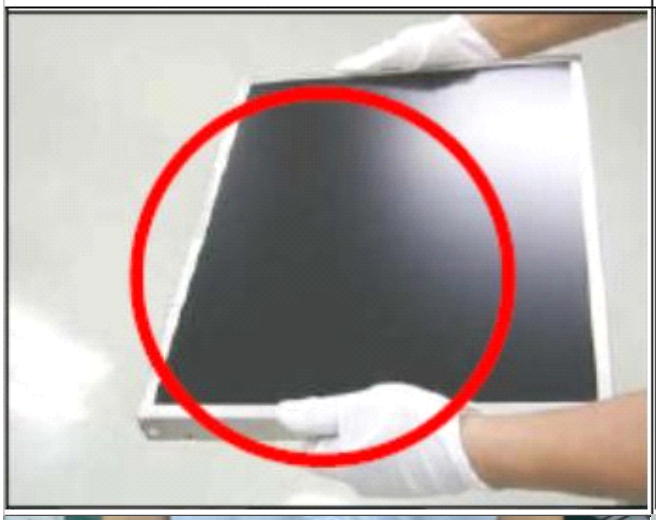
## 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety visual inspections and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Before replacing any of these components read the parts list in this manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics as specified in the parts list, may create shock, fire, or other hazards.

## 3. SERVICE NOTES

- When replacing parts or circuit boards, clamp the lead wires around terminals before soldering.
- Keep wires away from high voltage, high temperature components and sharp edges.
- Keep wires in their original position so as to reduce interference.
- Adjustment of this product please refers to the user' manual.

## 5.2 Handling and Placing Methods

| Correct Metbods: | Incorrect Methods: |
|---|---|
| Only touch the metal frame of the LCD panel or the front cover of the monitor. Do not touch the surface of the polarizer | Surface of the LCD panel is pressed by fingers and that may cause "Mura" |
|  | |
| | |
| Take out the monitor with cushions | Taking out the monitor by grasping the LCD panel. That may cause "Mura" |
| | |

| | |
|---|---|
| Place the monitor on a clean and soft foam pad. | Placing the monitor on foreign objects.That could scratch the surface of the panel or cause "Mura" |
| | |
| | The panel is placed facedown on the lap. That may cause "Mura". |
| | |

## 2. Specification

## 2.1.INTRODUCTION

| FEATURES | | | VX1945wm-3 |
|---|---|---|---|
| TFTLCD PANEL<br>1st<br><br>Innolux<br>MT190AW01 V.0 | Size | | 19 " wide |
| | Luminance (Typ) | | 300 cd/㎡ |
| | Contrast Ratio (Typ) | | 700:1 |
| | Colors | | 16.2 M (6 bits + 2 bits FRC) |
| | Response Time | | 5 ms(on/off) |
| | Viewing Angle (H/V) | | 160 ° / 160 ° |
| | Recommend resolution | | 1440x900@60Hz |
| Input Signal | Video | Analog (Head) | Yes (75ohms, 0.7/1.0 Vp-p) |
| | | Digital (Head) | Yes |
| | Audio | 3.5 mm Audio in (Head) | Yes |
| | | 3.5mm 2 in 1 Audio in (Base) | Yes |
| Output Signal | Audio | 3.5 Audio out (Base) | Yes |
| | | Headphone out (Base) | Yes |
| Sync Compatibility | Separate Sync | | Yes |
| | Composite Sync | | Yes |
| | Sync on Green | | Yes |
| Compatibility | PC | | Yes |
| | Power Mac | | Yes |
| | TV Box (NextVision 6) | | Yes |
| Power Voltage | AC 100-240V, 50/60Hz | | Yes |
| Power Consumption | LCD | On Mode(Typ) | < 48 W |
| | | Off Mode (Max) | ≦1 W |
| | Multimedia base | On Mode(Typ) | < 24 W |
| | | On Mode (Max) | ≦30 W |
| USB | Upstream port (B type) X 1 | | Yes |
| | Downstream port (A type) X 4 | | Yes |
| Card reader | 8 in 1 Function | | SD/MMC/MS/MS PRO/CF I & II /MicroDrive/SM |
| Audio | 2.1 CH - THD 10% (Max)<br>(Sat.: 2.5w x2 ; subwoofer:3w x1) | | Yes |
| Ergonomics | Tilt ( 20 ° - -5 °) | | Yes |
| | Swivel | | No |
| | Pivot | | No |
| | Height Adjust | | No |
| OSD Control | [ 1 ] [ 2 ] [⏻][▼] [▲] | | Yes |
| Dimension | Physical (W x H x D) | | 450 x 434 x 209mm |
| | Package (W x H x D) | | 545*515*162mm |
| Weight | Physical (Net Weight) | | 5.2 Kg / 11.5 lbs |

| | | |
|---|---|---|
| | Package (Gross Weight) | 6.7 Kg / 14.8 lbs |
| Operating Condition | Temperature (℉/℃) | 32℉-104℉ / 0℃-40℃ |
| | Humidity (%) | 20 % - 80 % |
| Storage Condition | Temperature (℉/℃) | -4℉-140℉ / -20℃-60℃ |
| | Humidity (%) | 10% - 90 % |
| Regulation | Global: CB, MPR II, WEEE,ROHS , ISO13406-2<br>VSA:UL, cUL, FCC-B, TUV-S, NOM, Energy Star<br>VSE:TUV/ERGO,CE ,GOST-R+Hygienic ,SASO , ENERGY<br>VSI: BSMI, CCC, PSB, C-TICK, MIC<br>VSCN:CCC | |

**ViewDock – Multimedia base Spec.**

| | | |
|---|---|---|
| **USB Standards** | **Device prococal** | USB 2.0/1.1<br>OHCI (Open Host Controller Interface)<br>EHCI (Enhanced Host Controller Interface) |
| **Compatible Operating Systems** | | USB 2.0 Speed<br>USB 1.x Speed<br>Mac OS X with USB 2.0 Support<br>Microsoft Windows XP/Me/2000/98SE with USB 2.0 Support<br>Mac OS 8.6 or above with USB 1.x Support and USB Card Support 1.4.1<br>Microsoft Windows XP/Me/2000/98SE with USB 1.x Support |
| **USB Hub** | **Upstream** | 1 Upstream USB Type B Receptacle |
| | **Downstream** | 4 Downstream USB Type A Receptacles |
| **USB Supplied Current** | | Self-Powered Mode: 500mA /Port<br>Idle Mode : 5mA /Port<br>Operating Mode: 100mA/Port |
| **Card Reader 4 slots** | | Secure Digital (SD)<br>Multi Media Card (MMC)<br>Compact Flash (CF) Type I<br>Compact Flash (CF) Type II<br>Micro Drive<br>Smart Media (SM)<br>Memory Stick (MS)<br>Memory Stick Pro (MS Pro)<br>XD |
| | **Upper Slot** | SMC/XD and SD/MMC |
| | **Lower Slot** | CF Type I/II and MS/MS Dual/MS Pro |
| **Audio / Speaker** | **Subwoofer** | 3.0W (typ) ; 5.0W (Max) |
| | **Nominal size** | Φ46mm |
| | **S/N** | >85dB |

| | | |
|---|---|---|
| | **THD** | < 10% (Vol. Max) |
| **MIC** | **S/N** | 60dB (Built-in) |
| | **Sensitivity:** | -38dB +- 3dB |
| **VR** | **Volume control** | Rotation stopper strength: 1.0Kgf.cm<br>Total rotational angle: 220± 5˚ |
| **Audio I/O** | **Input** | 2-in-1 Audio-in x 1 (Audio-in / MIC-in) |
| | **Output** | Audio-out x1 , Headphone out x1 |
| **iPOD connector** | | Compatible with iPOD video/iPOD photo/iPOD nano/iPOD Mini/iPOD U2/iPOD |
| **Power adapter** | **External** | Input Voltage Range: 100~240V<br>Input Frequency: 50/60Hz<br>Output Voltage: 12V<br>Full load: 2.0A<br>Peak load: 2.5A |
| **Size** | | 303mm (W) x 212mm (L) |
| **Connectivity** | | Up to 127 Devices by Cascading Multiple Hubs |
| **Diagnostic LEDs** | **Power on** | Yellow-Green |
| | **iPod connecting** | Amber |
| | **iPod connecting+Power on** | Yellow-green+Amber |
| **Power consumption** | **Typical** | 24W |
| | **Max.** | 30W |
| **Storage Temperature** | | -4ºF to 140ºF (-20ºC to 60ºC) |
| **Storage Humidity** | | 10% to 90% (Non-Condensing) |
| **Operating Temperature** | | 32ºF to 104ºF (0ºC to 40ºC) |
| **Opreating Humidity** | | 20% to 90% (Non-Condensing) |
| **Certifications** | | Global: CB, WEEE,ROHS<br>VSA:UL, cUL, FCC-B, TUV-S, NOM<br>VSE:CE ,GOST-R+Hygienic ,SASO<br>VSI:BSMI, CCC, PSB, C-TICK, MIC<br>VSCN:CCC |
| **Accessories** | | USB A-B Cable ; 2-in-1 Cable ; Power adaptor ; iPod adapter set (default x 1; 4 in set) |
| **Package content** | | Viewdock/Quick start guide/CD(for card reader windows 98 driver)/2-in-1 Aduio cable/USB cable/Power adapter/iPod adapter set |

## 2.2. GENERAL specification

| | |
|---|---|
| Test Resolution & Frequency | 1440x900 @ 60Hz |
| Test Image Size | Full Size |
| Contrast and Brightness Controls | Factory Default:<br>Contrast = 70%, Brightness = 100% |

## 2.3. VIDEO INTERFACE

| | |
|---|---|
| Analog Input Connector | DB-15 (Analog), |
| Digital Input Connector | DVI-D (Digital), |
| Default Input Connector | Defaults to the first detected input |
| Video Cable Strain Relief | Equal to twice the weight of the monitor for five minutes |
| Video Cable Connector DB-15 Pin out | Compliant DDC 1/2B |
| Video Signals | 1. Video RGB (Analog)<br>Separate, Composite, and Sync on Green<br>2. TMDS (Digital) |
| Video Impedance | 75 Ohms (Analog), 100 Ohms (Digital) |
| Maximum PC Video Signal | 950 mV with no damage to monitor |
| Maximum Mac Video Signal | 1250 mV with no damage to monitor |
| Sync Signals | TTL |
| DDC 1/2B | Compliant with Revision 1.3 |
| Sync Compatibility | Separate Sync, Composite Sync, SOG |
| Video Compatibility | Shall be compatible with all PC type computers, Macintosh computers, and after market video cards |
| Resolution Compatibility | 640 x 350*, 640 x 480, 720 x 400* (640 x 400*), 800 x 600, 832 x 624, 1024 x 768, 1152 x 864, 1152 x 870, 1280 x 720, 1280 x 960, 1280 x 1024 , 1400 x 1050 , 1440 x 900<br><br>* The image vertical size might not be full screen.<br>But the image vertical position should be at the center. |
| Exclusions | Not compatible with interlaced video |

## 2.4. POWER SUPPLY

| | |
|---|---|
| Internal Power Supply | Part Number:ILPI-024 |
| Input Voltage Range | 90 to 264 VAC (100~240VAC ±10%) |
| Input Frequency Range | 47 to 63 Hertz |
| Short Circuit Protection | Output can be shorted without damage |
| Over Current Protection | 5.0 A typical at 14.0 VDC |

| | |
|---|---|
| Leakage Current | 3.5mA (Max) at 254VAC / 60Hz |
| Efficiency (at 115VAC Full Load) | Typical: 80%<br>Minimum: 75% |
| Fuse | Internal and not user replaceable |
| Power Output | 35 Watts (typ) |
| Ripple and Noise | Ripple: <3% |
| Max Input AC Current | 1.2 Arms @ 100VAC, 0.6 Arms @240VAC |
| Inrush Current (Cold Start) | 40 A (max) @ 120VAC<br>60 A (max) @ 220VAC |
| Power Supply Cold Start | Shall start and function properly when under full load, with all combinations of input voltage, input frequency, and operating temperature. |
| Power Supply Transient Immunity | Shall be able to withstand an ANSI/IEEE C62.41-1980 6000V 200 ampere ring wave transient test with no damage. |
| Power Supply Line Surge Immunity | Shall be able to withstand 1.5 times nominal line voltage for one cycle with no damage. |
| Power Supply Missing Cycle Immunity | Shall be able to function properly, without reset or visible screen artifacts, when ½ cycle of AC power is randomly missing at nominal input. |
| Power Supply Acoustics | The power supply shall not produce audible noise that would be detectable by the user. Audible shall defined to be in compliance with ISO 7779 (DIN EN27779:1991) Noise measurements of machines acoustics. Power Switch noise shall not be considered. |
| Power Saving Operation(Method) | VESA DPMS Signaling |
| Power Consumption | |

| Mode | LED | Power Consumption |
|---|---|---|
| On | Green | 35 W (Typ)<br>42 W (max) |
| Stand By | Amber | < 2 W |
| Active Off | Off | < 1 W |

| | |
|---|---|
| Recovery Time | On Mode = N/A, Active Off < 3 sec |

## 2.5.ELECTRICAL REQUIREMENT

**Horizontal / Vertical Frequency**

| | |
|---|---|
| Horizontal Frequency | 24-83 khz |
| Vertical Refresh Rate | 50 – 85* Hz |
| Maximum Pixel Clock | 140 MHz |
| Sync Polarity | Independent of sync polarity. |

**Timing Table**

| Item | Timing | Analog | | | Digital - TMDS | Remark |
|---|---|---|---|---|---|---|
| | | Separated | Composite | SOG | | |
| 1 | 640 x 350 @ 70 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, the image vertical size image will be not full screen (Still at the center) |
| 2 | 640 x 400 @ 60 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, the OSD will be 640x480@60Hz |
| 3 | 640 x 400 @ 70 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, the image vertical size image will be not full screen (Still at the center), And the OSD will be 640x400/720x400 (primary= 720x400). |
| 4 | 640 x 480 @ 50 Hz, 24.7 KHz | ✓ | ✓ | ✓ | | |
| 5 | 640 x 480 @ 60 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | |
| 6 | 640 x 480 @ 67 Hz, 35 KHz | ✓ | ✓ | ✓ | ✓ | |
| 7 | 640 x 480 @ 72 Hz, 37.9 KHz | ✓ | ✓ | ✓ | ✓ | |
| 8 | 640 x 480 @ 75 Hz, 37.5 KHz | ✓ | ✓ | ✓ | ✓ | |
| 9 | 640 x 480 @ 85 Hz, 43.3 KHz | ✓ | ✓ | ✓ | ✓ | |
| 10 | 720 x 400 @ 70 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, the image vertical size image will be not full screen (Still at the center), And the OSD will be 640x400/720x400 (primary= 720x400). |
| 11 | 720 x 480 @ 60 Hz, 31.5 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, the information OSD shows 640x480 |
| 12 | 720 x 576 @ 50 Hz, 31.3 KHz | ✓ | ✓ | ✓ | ✓ | |
| 13 | 800 x 600 @ 56 Hz, 35.1 KHz | ✓ | ✓ | ✓ | ✓ | |
| 14 | 800 x 600 @ 60 Hz, 37.9 KHz | ✓ | ✓ | ✓ | ✓ | |
| 15 | 800 x 600 @ 72 Hz, 48.1 KHz | ✓ | ✓ | ✓ | ✓ | |
| 16 | 800 x 600 @ 75 Hz, 46.9 KHz | ✓ | ✓ | ✓ | ✓ | |
| 17 | 800 x 600 @ 85 Hz, 53.7 KHz | ✓ | ✓ | ✓ | ✓ | |
| 18 | 832 x 624 @ 75 Hz, 49.7 KHz | ✓ | ✓ | ✓ | ✓ | |
| 19 | 1024 x 768 @ 50 Hz, 39.6 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, Switch 1024x768@50Hz and |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | 1280x768@50Hz by [1]+[2] short cut key |
| 20 | 1024 x 768 @ 60 Hz, 48.4 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 21 | 1024 x 768 @ 70 Hz, 56.5 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 22 | 1024 x 768 @ 75 Hz, 60 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 23 | 1024 x 768 @ 75 Hz, 60.02 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 24 | 1024 x 768 @ 85 Hz, 68.7 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 25 | 1152 x 864 @ 75 Hz, 67.5 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 26 | 1152 x 870 @ 75 Hz, 68.7 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 27 | 1280 x 768 @ 50 Hz, 39.6 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, Switch 1024x768@50Hz and 1280x768@50Hz by [1]+[2] short cut key | |
| 28 | 1280 x 768 @ 60 Hz, 47.4 KHz | ✓ | | | ✓ | | |
| 29 | 1280 x 768 @ 60 Hz, 47.8 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 30 | 1280 x 768 @ 75 Hz, 60.3 KHz | ✓ | ✓ | ✓ | ✓ | For Analog sync, Switch 1024x768@75Hz and 1280x768@75Hz by [1]+[2] short cut key | |
| 31 | 1280 x 960 @ 50 Hz, 49.4 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 32 | 1280 x 960 @ 60 Hz, 60.0 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 33 | 1280 x 960 @ 75 Hz, 75.2 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 34 | 1280 x 1024 @ 50 Hz, 52.7 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 35 | 1280 x 1024 @ 60 Hz, 64 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 36 | 1280 x 1024 @ 70 Hz, 74.8 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 37 | 1280 x 1024 @ 72 Hz, 76.8 KHz | | | | ✓ | | |
| 38 | 1280 x 1024 @ 75 Hz, 80 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 39 | 1360 x 768 @ 60 Hz, 47.7 KHz | ✓ | | | ✓ | | |
| 40 | 1400 x 1050 @ 50 Hz, 54.1 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 41 | 1400 x 1050 @ 60 Hz, 64.7 KHz | ✓ | | | ✓ | | |
| 42 | 1400 x 1050 @ 60 Hz, 65.3 KHz | ✓ | ✓ | | ✓ | | |
| 43 | 1400 x 1050 @ 75 Hz, 82.3 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 44 | 1440 x 900 @ 60 Hz, 55.5 KHz | ✓ | | | ✓ | | |
| 45 | 1440 x 900 @ 60 Hz, 55.9 KHz | ✓ | ✓ | ✓ | ✓ | | |
| 46 | 1440 x 900 @ 75 Hz, 70.6 KHz | ✓ | ✓ | ✓ | ✓ | | |

*1. Tolerance ≧ ±2KHz.

*2. Any timing not in the list, it should display as normal or show on “OUT OF RANGE” OSD message without blanking.

*3. The image quality of 85Hz mode might be worse than 75Hz.

## 2.6 TFT LCD PANEL

**Panel Characteristics:**

**1st Source Panel**

| | |
|---|---|
| Model number | INNOLUX MT190AW01 V.0 |
| Type | TN type with LVDS interface |
| Active Size | 19" WIDE ; 410.4(H) X 256.5(V) |
| Pixel Arrangement | RGB Vertical Stripe |
| Pixel Pitch | 0.285(H) x 0.285(H) mm |
| GLASS TREATMENT | Anti Glare (Hard coating 3H) |
| # OF BACKLIGHTS | 4 CCFL ; Top & Bottom edge side |
| BACKLIGHT LIFE | 40,000 Hours (Min) |
| Luminance (5-point) – Condition: CT = 6500K, Contrast = Max, Brightness = Max | 300 cd/m2 (Typ after 30 minute warm up)<br>230 cd/m2 (Min after 30 minute warm up) |
| Brightness Uniformity | ≧75% Entire Area (min) |
| Contrast Ratio | 700:1 (typ), 500:1 (min) |
| Color Depth | 16.2 million colors (6 bits + 2 bits FRC) |
| Viewing Angle (Horizontal) | @ CR>10<br>Typical: 160º<br>Minimum: 140º<br>@ CR>5<br>Typical: TBD<br>Minimum: TBD |
| Viewing Angle (Vertical) | @ CR>10<br>Typical: 160º<br>Minimum: 140º<br>@ CR>5<br>Typical: TBD<br>Minimum: TBD |
| Response Time<br>10%-90% @ Ta=25°C | Typical = 5ms (Tr =1.5 ms,Tf =3.5 ms)<br>Maxmum = 15ms (Tr =6.5 ms,Tf =8.5 ms) |
| Panel Defects | Please see Panel Quality Specifications. |

**Function descriptions**

**OSD Lock short cuts function for the buttons**

The OSD lock will be activated by pressing the front panel control buttons "(1), & (▲)" for 10 seconds. If the user then tries to access the OSD by pressing any of the buttons "1", "▼", "▲", "2" a message will appear on the screen for 3 seconds showing "OSD Locked". The OSD lock will be deactivated by pressing the front panel control buttons "(1), & (▲)" again for 10 seconds.

Note1: When the OSD is locked will lock all functions, including “Volume” and “Mute”

Note 2: Status bar indicating OSD Lock or Unlock is in progress and when complete it will indicate “OSD Locked”

Note 3: OSD Lock should not lock Power Button and Power Lock function

**Power Lock short cuts function for the buttons**

The power button lock will be activated by pressing the front panel control buttons "(1), & (▼)" for 10 seconds. Locking the power button means that the user won't be able to turn off the LCD while the power button is locked. If the user presses the power button while it is locked, a message will appear on the screen for 3 seconds showing "Power Button Locked". It also means that with the power button locked, the LCD would automatically turn back "On" when power is restored after a power failure. If the power button is not in the locked mode, then power should return to it's previous state when power is restored after a power failure. The power button lock will be deactivated by pressing the front panel control buttons "(1), & (▼)" again for 10 seconds.

Note 1: Status bar indicating Power Button lock or unlock is in progress and when complete it will indicate “Power Button Locked”

Note 2: Power should only be lockable in the “On State”

**Memory Recall Actions**

Memory Recall action on the analog and digital mode as below

1. Recall white balance to factory setting
2. Set the factory defaults as shown in Section 4-8
3. Clean all the mode setting buffer
4. Execute Auto Image Adjust

Note: Memory Recall should have no effect for Language, Power Lock, User Color Settings or Input Priority

**Resolution Notice Actions**

Resolution Notice OSD should show on screen after changing to non-native mode for 30 sec

For auto input select function, it shall meet the requirement in Appendix D.

The OSD should disappear after 10 sec or by pushing button [1] or [2]

Resolution Notice function should be disabled when push button [2] under Resolution Notice OSD

**0-Touch™ Function Actions**

1. Execute Auto Image Adjust when new mode detected, and save the settings to buffer for

| |
|---|
| further use<br>2. It should be reset by Memory Recall function(Should not reset by power off, power unplug and others) |
| **OSD Auto Save**<br>The OSD shall save new settings when it is turned off by the user or when it times out. There shall not be a separate save |

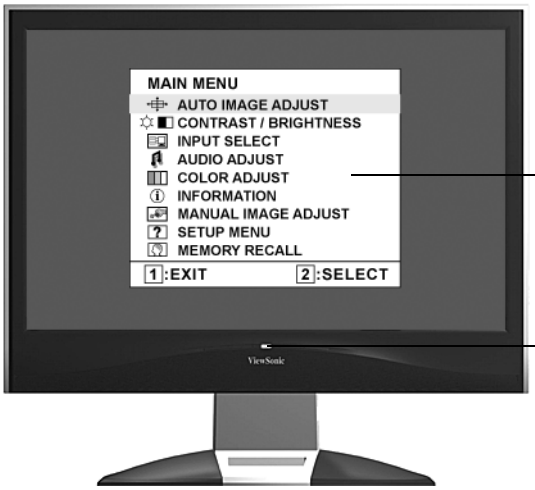
**Factory Defaults**

| Item | Defaults | Item | Defaults |
|---|---|---|---|
| Contrast | 70% | Input Priority | N/A |
| Brightness | 100% | Resolution Notice | Enabled |
| Color Temperature | 6500K | Volume | N/A |
| Sharpness | 100% | Balance | N/A |
| OSD H. Position | 50% | Treble | N/A |
| OSD V. Position | 50% | Bass | N/A |
| OSD Time Out | 15 Sec | | |
| OSD Background | Enabled | | |

## 2.7 AUDIO INTERFACE (SPEAKER SPECIFICATION)

| | |
|---|---|
| Line input signal | 1 Vrms |
| Line input impedance | 10 kOhm |
| Maximum Amp power output (Watt) | 2.0 W (RL=8Ω) |
| Speaker Power rating(Ω/Watt) | 8Ω/2 W (typ.) ; 8Ω/ 3 W (max) |
| THD | 10% (Maxmum output @ 1KHZ) |
| Signal to Noise Ratio | 75 dB |
| Frequency response | 200 Hz – 20 Khz |
| SPL. | 82 ± 3 dB |
| Line input connection | 3.5 mm stereo jacks |
| Vibration | There should be no audible vibration resonance at volume=100% & treble / bass in def. value |
| Screen image | There should be no affect on the screen image stability under any conditions |
| Connector PC99 requirement Audio in | Lime Green pantone # 577C |
| Cable type / length | 3.5mm stereo cable / 1.8m length |
| Audio DPMS | Speakers stay Off when the rest of the monitor is in power saving<br>Note: There is no guarantee <2 W at power consumption in Active Off mode, when the Audio Cable is connected |

# Adjusting the Screen Image




**Main Menu**
with OSD controls

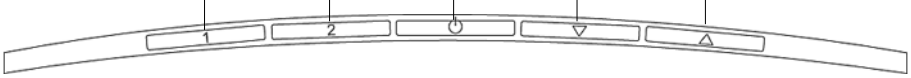
**Front Control Panel**
shown below in detail

Displays the control screen for the highlighted control.
Also toggles between two controls on some screens.
Also a shortcut to Auto Image Adjust.

Standby Power On/Off
Power light
Blue = ON
Orange = Power Saving

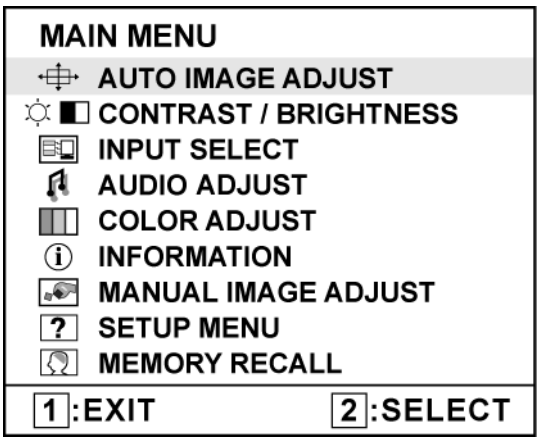
Scrolls through menu options and adjusts the displayed control.
Also a shortcut to display the Contrast adjustment control screen.

Displays the Main Menu or exits the control screen and saves adjustments.



### Do the following to adjust the display setting:

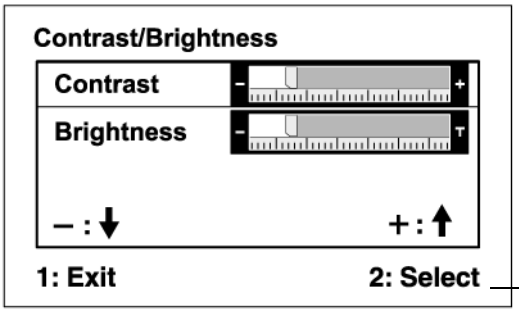
**1.** To display the Main Menu, press button [1].




**NOTE:** All OSD menus and adjustment screens disappear automatically after about 15 seconds. This is adjustable through the OSD timeout setting in the setup menu.

**2.** To select a control to adjust, press▲or▼to scroll up or down in the Main Menu.

**3.** After the desired control is selected, press button [2]. A control screen like the one shown below appears.




The command line at the bottom of the control screen tells what to do next from this screen. You can toggle between control screens, adjust the selected option, or exit the screen.

**4.** To adjust the setting, press the up ▲ or down ▼ buttons.

**5.** To save the adjustments and exit the menu, press button [1] *twice*.

### The following tips may help you optimize your display:

- Adjust the computer's graphics card so that it outputs a 1440 x 900 @ 60Hz video signal to the LCD display. (Look for instructions on "changing the refresh rate" in the graphics card's user guide.)
- If necessary, make small adjustments using H. POSITION and V. POSITION until the screen image is completely visible. (The black border around the edge of the screen should barely touch the illuminated "active area" of the LCD display.)

# Main Menu Controls

Adjust the menu items shown below by using the up ▲ and down ▼ buttons.

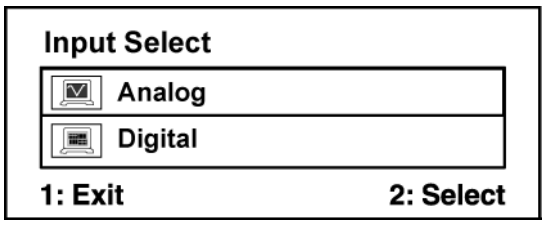
| Control | Explanation |
|---|---|

**Auto Image Adjust** sizes and centers the screen image automatically.

**Contrast** adjusts the difference between the image background (black level) and the foreground (white level).

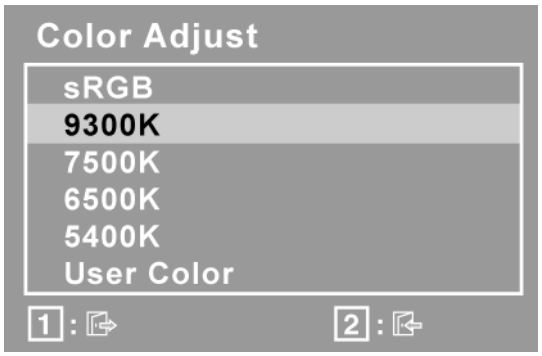
**Brightness** adjusts background black level of the screen image.

**Input Select** toggles between inputs if you have more than one computer connected to the VX1945wm.




**Audio Adjust**
**Volume** increases the volume, decreases the volume, and mutes the audio.
**Mute** temporarily silences audio output.

**Color Adjust** provides several color adjustment modes, including preset color temperatures and a User Color mode which allows independent adjustment of red (R), green (G), and blue (B). The factory setting for this product is 6500K (6500 Kelvin).



**sRGB-**This is quickly becoming the industry standard for color management, with support being included in many of the latest applications. Enabling this setting allows the LCD display to more accurately display colors the way they were originally intended. Enabling the sRGB setting will cause the Contrast and Brightness adjustments to be disabled.

**9300K-**Adds blue to the screen image for cooler white (used in most office settings with fluorescent lighting).

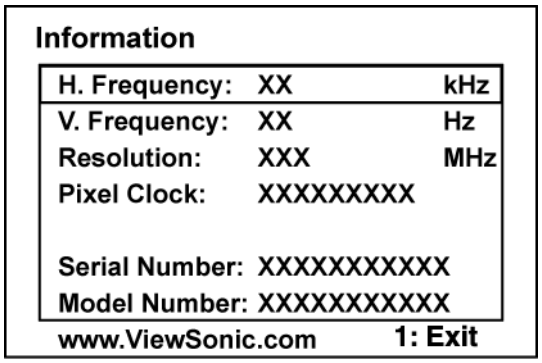
**7500K -** Adds blue to the screen image for cooler white (used in most office settings with fluorescent lighting).

**6500K-**Adds red to the screen image for warmer white and richer red.

**5400K-**Adds green to the screen image for a darker color.

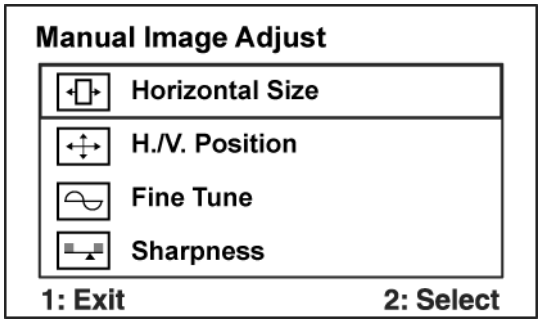
**User Color** Individual adjustments for red (R), green (G), and blue (B).
**1.** To select color (R, G or B) press button [2].
**2.** To adjust selected color, press▲and▼.
**Important:** If you select RECALL from the Main Menu when the product is set to a Preset Timing Mode, colors return to the 6500K factory preset.

**Information** displays the timing mode (video signal input) coming from the graphics card in the computer, the LCD model number, the serial number, and the ViewSonic® website URL. See your graphics card's user guide for instructions on changing the resolution and refresh rate (vertical frequency).
**NOTE:** VESA 1440 x 900 @ 60Hz (recommended) means that the resolution is 1440 x 900 and the refresh rate is 60 Hertz.



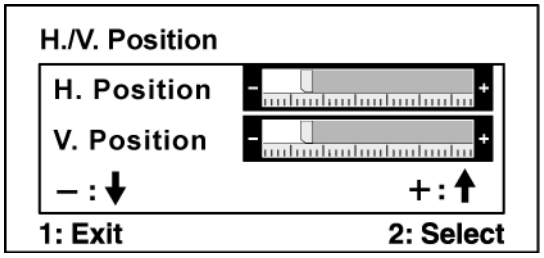
| Control | Explanation |
|---|---|

**Manual Image Adjust Sub-menu**




**H. Size (Horizontal Size)** adjusts the width of the screen image.

**H./V. Position (Horizontal/Vertical Position)** moves the screen image left or right and up or down.

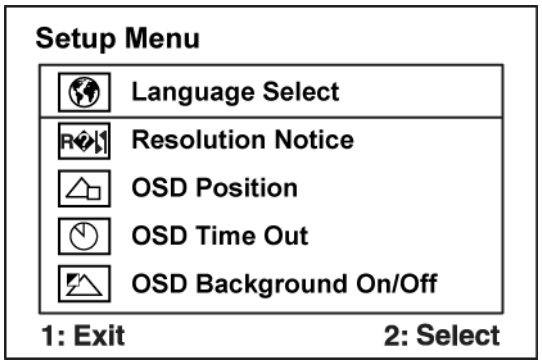



**Fine Tune** sharpens the focus by aligning text and/or graphics with pixel boundaries.

**NOTE:** Try Auto Image Adjust first.

**Sharpness** adjusts the clarity and focus of the screen image.

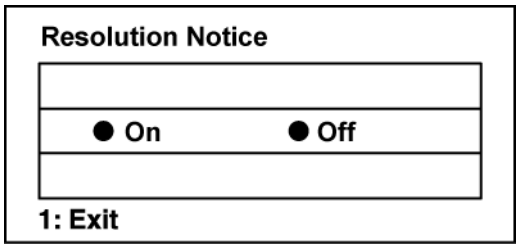
**Setup Menu** displays the menu shown below:



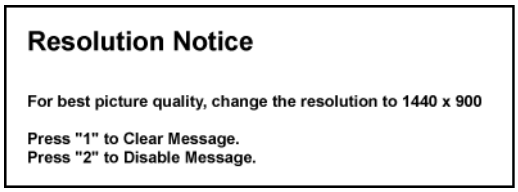

**Language Select** allows the user to choose the language used in the menus and control screens.

| Control | Explanation |
|---|---|

**Resolution Notice** allows the user to enable or disable this notice.




If you enable the Resolution Notice shown above and your computer is set at a resolution other than 1440 x 900, the following screen appears.


Resolution Notice
For best picture quality, change the resolution to 1440 x 900
Press "1" to Clear Message.
Press "2" to Disable Message.

**OSD Position** allows the user to move the OSD menus and control screens.

**OSD Timeout** sets the length of time the OSD screen is displayed. For example, with a "30 second" setting, if a control is not pushed within 30 seconds, the display screen disappears.

**OSD Background** allows the user to turn the OSD background On or Off.

**Memory Recall** returns the adjustments back to factory settings if the display is operating in a factory Preset Timing Mode listed in the Specifications of this manual.

# ViewDock™ Key Features

## Features

The VX ViewDock comes with the following advanced features:

- 4-port USB 2.0 hub (USB 1.1 compatible)
- 8-in-1 card reader (SD, MMC, MS, MS Pro, CF I & II, MD, SMC)
- 3-watt subwoofer support
- iPod docking & charging
- Headphone jack and built-in microphone

## System requirements

For optimal use with the ViewDock, the computer should have the following minimum system requirements:

### Hardware requirements

- Pentium 200 CPU or higher
- CD-ROM for driver installation
- USB2.0/1.1 interface
- 32 MB memory

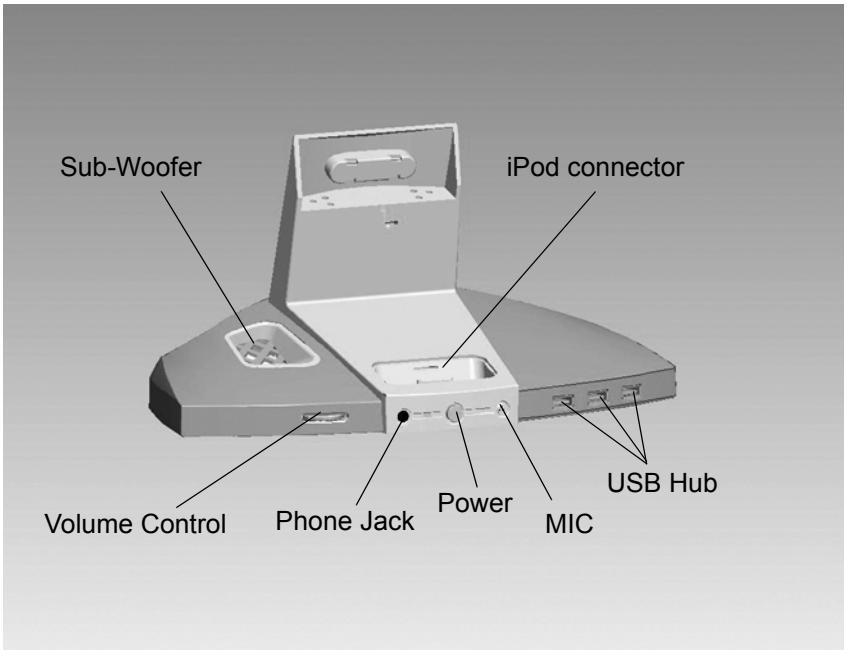
### Software Requirements

- Microsoft Windows 98SE/2000/ME/XP
- MAC OS 8.5+ or higher version.

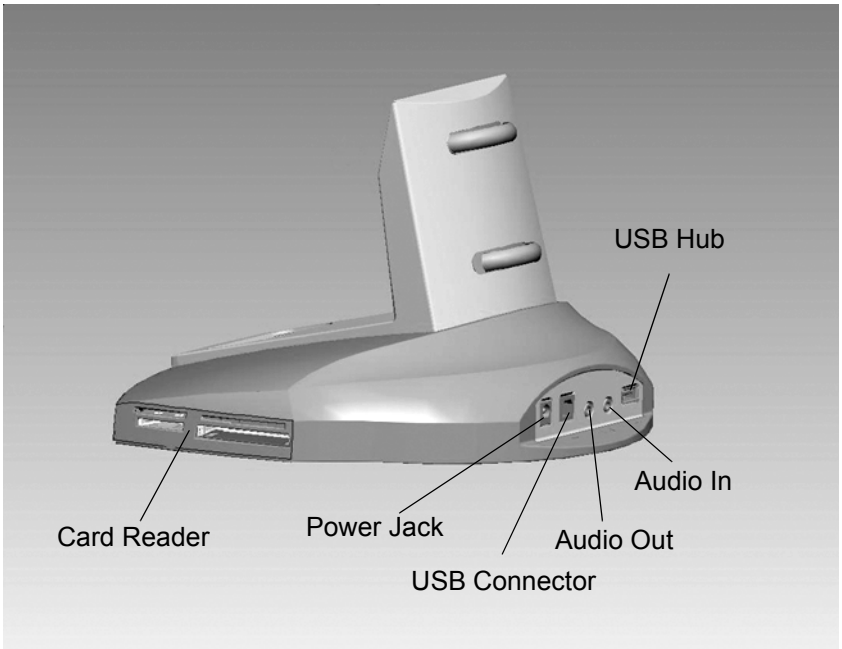
# Physical Description

Please refer to the following illustrations to identify the components of the ViewDock.

### Front View




### Rear view

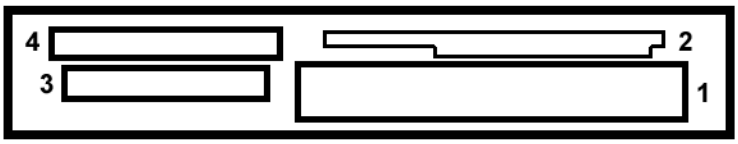


# Card Reader Installation

### Refer to the following information

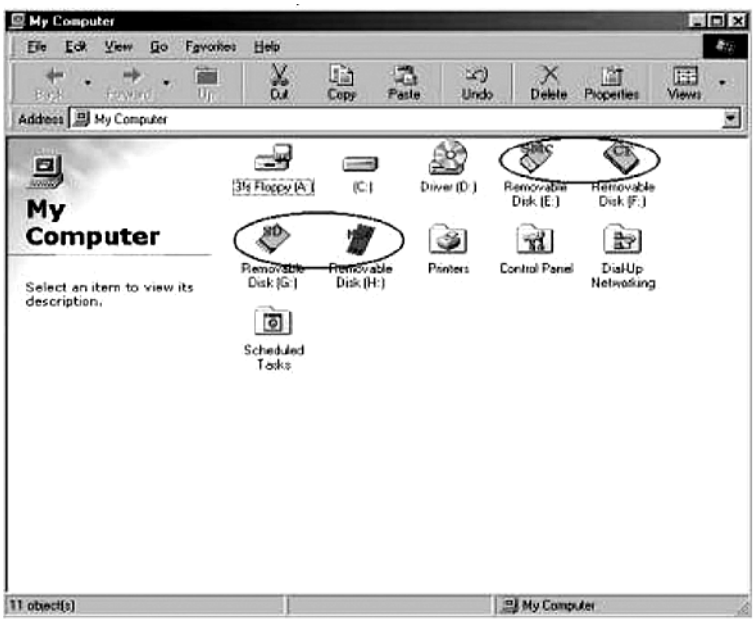
After connecting the ViewDock to your PC, Windows File Manager will show 4 extra icons.

Step1. Please check your card socket




1. CFI/II/MD
2. SMC
3. MS/MS PRO
4. SD/MMC

Step2. Insert your memory card. Each slot of the card reader will be recognized as a Removable Disk and the icon will be shown in "My Computer" of Windows




You do not need to install any special drivers for the Card Reader if your OS is Windows 2000/ ME/XP.

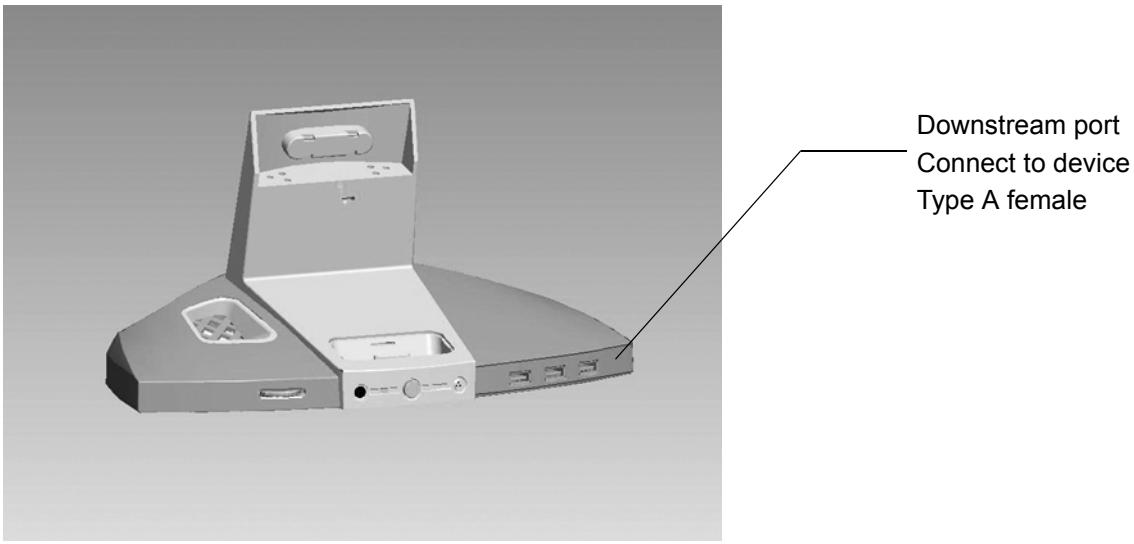
### Card reader Installation guide for Windows 98SE :

(Please do not connect the ViewDock to your PC's USB port before running the CD):

1. Insert the driver CD into the CD-ROM
2. Please launch the .exe file and the driver will be installed automatically.
3. After completing installation, connect the ViewDock to your PC's USB port. The card reader is now operational.
4. Each slot of the card reader will be recognized as a Removable Disk and the icon will be shown in "My Computer."

# USB Hub Installation

### Refer to the following information




Connect any USB devices via the USB ports on the ViewDock.

Windows will auto detect and install the generic Windows USB driver for USB 1.1/2.0 device operation.

You do not need to install any special drivers for the USB Hub if your OS is Windows 2000/ ME/XP.

### USB hub installation guide for Windows 98SE :

Insert the included CD into the CD-ROM drive. The Autorun feature will automatically begin the installation process. Follow the instructions on the screen to install the driver.

If the setup program does not start automatically, go to "My Computer" and double-click on the CD-ROM drive, and select "Setup.exe" from the CD.

**Note:** If USB device is not detected , does not work properly:

1. Double click the "System" icon in Control Panel.
2. Select the "Device Manager" tab from System Properties dialog window.
3. Select "Other devices" to see the contents.
4. Select "Unknown device" and click "Remove" button.
5. Click the "Refresh" button and system will find a new device.

# ViewDock™ Connecting with iPod

### Refer to the following information

1. Make sure the ViewDock power is ON.
2. Dock your iPod into the universal iPod docking station with the appropriate adapter insert.
3. The iPod LED indicator will turn on amber
4. Wait for a few seconds for the iTunes software to launch.
5. Play your favorite song with iTunes software (for all iPod models) or play music from iPod directly (excluding iPod shuffle.)

### iPod adapter insert description:

iPod with video adaptor is a default setting for multimedia base.

| Adapter No. | Work with Ipod models |
|---|---|
| 1. | iPod nano |
| 2. | iPod mini (1st/ 2nd Generation) |
| 3. | iPod Vedio<br>iPod with color display (20G/U2)<br>iPod with Click Wheel (20G/U2) |
| 4. | iPod with color display (30G)<br>iPod with dock connector (10/15/20G) |
| 5. | iPod with color display (60G)<br>iPod photo (40/60G)<br>iPod with Click Wheel (40G)<br>iPod with dock connector (30/40G) |

# Subwoofer Volume Control

### Refer to the following information

1. Adjust subwoofer volume via volume control
2. " " Turn right to increases the subwoofer volume.
3. " " Turn left to decreases the subwoofer volume.
4. In order to obtain the optimum listening environment, please adjust the volume of stereo speakers in the monitor head via the monitor OSD menu to match and balance the subwoofer volume.

# 4. Circuit Description

## 4.1 Switching Mode Power Supply

### 4.1.1 AC Current Input Circuit

P801 is a connector for connecting AC Power. F801 is a fuse to protect all the circuit. AC input voltage is from 90v to 264V. R801 and R802 joined between two inputting main circuit to prevent man from shock. L801 is used to clear up low frequency wave. C801 and C802 are used to discharge the waves that L801 produced. High frequency waves are damped by C801 and C802. D801 is a rectifier which composed of 4 build-in diodes, it inverts AC to DC.

### 4.1.2 High Voltage to Low Voltage Control Circuit

C804 is used to smooth the wave from rectifier. IC802 is a highly integrated PWM controller. When rectified DC high voltage is applied to the HV pin during start-up, the MOSFET Q804 is initially off, and the Vcc pin capacitor is charged. When the Vcc pin voltage reaches approximately 10V, the control circuitry is activated and the soft-start begins. The soft-start circuit gradually increases the duty cycle of the MOSFET from zero to the maximum value over approximately 4ms. If no external feedback/supply current is fed into the FB pin by the end of the soft-start, the current Setpoint will be above the fault level, FAULT flag is raised, if the FAULT duration exceeds 80ms, the output controller disable

Resistor R808, R809, R810, R811 are for line over voltage shutdown(OVP)

When PWM is turned off, the main current flow will be consumed through R804 and D802, This will prevent MOSFET Q804 from being damaged under large current impulse and voltage spike.

D803 and C807 to provide internal Auxiliary voltage to Vcc pin during normal operation. Otherwise, error amplifier and feedback current input the FB pin for duty cycle control.

### 4.1.3 DC_5V and DC_14V Output Circuit

For DC 5V, D805 is used to rectify the inducted current. R828 and C814 are used to store energy when current is reversed. The parts including C818, C822, C820,L803 are used to smooth the current waves.

For DC 14V, D803 is used to rectify the inducted current. R827 and C813 are used to store energy when current is reversed. The parts including C815, C817 and L802 are used to smooth the current waves.

### 4.1.4 Feedback and OVP Protect Circuit

Pin R of IC803 is supplied 2.5-v stable voltage. It connects to 5V and 14V output through R822, R823 and R824. R822, R823 and R824 are output sampling resistor. When the sampling voltage more than 2.5V or less than 2.5V, current of FB IC802 will change, this can change the voltage from T801.

OVP Protect Circuit: When output is overvoltage, the auxiliary winding voltage will be increased, when it reaches about 14V. Q803 is triggered . It makes the IC802 Pin 1 exceed 5V, then the IC802 output will be disabled.

Q801, R816, R817 and ZD803 make up of dummy loading circuit. For start-up sequence, during 5V output take place high loading first, this dummy loading circuit operated to insure 14V not be increased.

## 4. 2 Inverter Circuit

1R503, ZD501, R502, Q501 components convert +14V voltage into +5.0V voltage, and the voltage supply to IC501. The extra PWM pulse signal (BRIGHTNESS signal)input to control IC through R512, R514, C510, The LCT pin is set to a DC voltage of 0.7V by using a resistor divider(R507, R516), change the duty of PWM pulse, will regulate the lamp current. The ON/OFF voltage connect to pin10 of IC501 through D501, R501, A voltage of 2V to pin10 of IC501 enables the IC and activates the striking timer. The SSTCMP pin of IC501 performs the soft function, the C511 set the time of SST. The operation frequency determined by external capacitor C512, C521 and resistor R508 connected at CT pin of IC501. C515 connect the TIMER pin of IC501, the capacitor to set striking time and shunt down delay time. DRV!, DRV2 output for power MOSFET U501, U502.

2.OZ9938 provides two drive signals forU501, U502, and they work in push pull topology driving, two transformers are connected in parallel with each transformer driving two lamps in series.Turningeach N-Channel MOSFET “on/off” complementarily, produces an alternating current through thetransformer primary and secondary. The “on” duration of the switches determines the amount of energy delivered to the CCFLs. R504, C504, R505, C505, R532, C529, R530, C522 are snubber networks, they suppress Voltage transient spike in drain of power MOSFET.

3. R506, R510, C509, C513, C514, R525, R531, C528, C525, and C527 are connected betweenhigh voltage output connector and ground, the divided AC voltage is inverted DC voltage through D502, D503, D508, and D509.The sense voltage feedback to VSEN (pin 6 of IC501) for an over voltage/over current condition during normal operation. R528, R533 are current sense resistor, current sense signal feed back to Isense (pin 5 of IC501) for lamp “ON” detection.

### 4.3 I/F Board Circuit

4.2.1 Power Input

+5V is from the power board and supply for U101(LD1117AL-3.3V)、U105(TSUM56AL-1) and panel. +3.3V output is generated from +5V through C101 and C103 filtering, and U101 outputs. +3.3V is used for U105 (MCU & Scaler: TSUM16AL). +1.8V output is generated from +3.3V through U102 outputs. +1.8V is only used for U105.

4.2.2 MCU & Scaler(TSUM16AL)

The frequency of XTAL1 is 14.318MHz. U105 # 48 is defined as panel-enable. When the I/O port is high, Q101 and Q103 are conducted. And then after C108 and C109 filtering, obtain the voltage of VLCD, which will be connected to CN104. U105 # 85 is defined as CCFL-enable. When the I/O port is low, Q106 is pulled up and the backlights are on; When the I/O port is high, Q106 is conducted and the backlights are off. U105 # 35 is defined as DET-VGA, connected with CN103 #5. U105 # 84 is a pin of hardware reset. U105 # 54-# 55,# 58-# 65, # 67-# 74, # 77-# 78 output LVDS digital data of 8 bit to panel control circuit through CN104. U105 # 86 generates a PWM waveform by regulating the duty to control the brightness of the backlights.

U103 is EEPROM used for saving EDID data, which is connected by SCL and SDA pins with # 31 and # 30 of TSUM56AL-1.

U106 is a flash memory, U106 # 2, # 1, # 6, # 5 are the communications with U105 # 37-# 40.

U108 is EEPROM used for saving user’s OSD setting. U108 is connected by SCL and SDA pin with # 44 and # 43 of TSUM16AL.

4.2.3 VGA Input

Signal R, G, B input through CN103 #1, #2, #3, and C112, C113 and C114 filtering the high frequency noise. Signal HSYNC and VSYNC input through CN103 #13 and #14, and C125, R137, C126, R136 filtering. Then the analog signal enters U105, and then U104 deals with it internally. In addition, TVS101, TVS102, TVS103, TVS104 (the four are BAV99), ZD101, ZD105, ZD106, ZD107, ZD108(they are constant voltage diode of 5V6) are ESD protector. Signal DDC-SCL inputs via CN103 #15, and then passes through ZD101 for ESD protection, goes into EDID EEPROM IC U103. Signal DDC-SDA inputs via CN103 #12, and then passes through ZD107 for ESD protection, goes into EDID EEPROM IC U103. CN103 #5 is defined as cable detect pin, this detector realizes via R124 and U105 # 35,The PC-5V of U103 is supplied by PC via CN103 #9 with D103 for ESD protection, or supplied by Monitor self via D103.U103 is an EEPROM IC, which is a kind of memory and used for saving EDID data.

4.2.4 Button Control

Button “Key-Power” is defined as power on/off, which is connected to U105 # 90 through CN105 # 6.

Button “Key-2” is defined as two functions of selecting and adjustment, which is connected to U105 #94 through CN105 # 5.

Button “Key-Up” is defined as plus, which is connected to U105 # 95 through CN105 # 8.

Button “Key-Down” is defined as minus, which is connected to U105 # 99 through CN105 # 7.

Button “Key-1” is defined as two functions of menu and exit, which is connected to U105 # 89 through CN105 # 4.

LED indicator on the front bezel is defined as follows:

a. When press button “Key-Power”, U105 # 91 is pulled down and U105 # 92 is pulled high, so Q102 is conducted and the LED indicator is green.

b. When in power-saving mode, U105 # 91 is pulled high and U105 # 92 is pulled down, so Q105 is conducted and the LED indicator is orange.

**4.4 FACTORY PRESET TIMING TABLE**

| TIMING | $F_H$(KHz) $F_V$(Hz) | Sync Polarity | Total (Dot/Line) | Active (Dot/Line) | Sync Width (Dot/Line) | Back Porch (Dot/Line) | Pixel Freq.(MHz) |
|---|---|---|---|---|---|---|---|
| 640*350@70Hz | 31.469 | + | 800 | 640 | 96 | 48 | 25.175 |
| | 70.086 | – | 449 | 350 | 2 | 60 | |
| IBM 640*400@70Hz | 31.469 | – | 800 | 640 | 96 | 48 | 25.175 |
| | 70.086 | + | 449 | 400 | 2 | 35 | |
| IBM 720*400@70Hz | 31.469 | – | 900 | 720 | 108 | 54 | 28.322 |
| | 70.087 | + | 449 | 400 | 2 | 35 | |
| 640*480@50Hz | 24.700 | – | 800 | 640 | 96 | 48 | 19.760 |
| | 50.000 | – | 494 | 480 | 2 | 8 | |
| VESA 640*480@60Hz | 31.469 | – | 800 | 640 | 96 | 40 | 25.175 |
| | 59.940 | – | 525 | 480 | 2 | 25 | |
| 640*480@67Hz | 35.000 | – | 864 | 640 | 64 | 96 | 30.240 |
| | 66.667 | – | 525 | 480 | 3 | 39 | |
| VESA 640*480@72Hz | 37.861 | – | 832 | 640 | 40 | 120 | 31.500 |
| | 72.809 | – | 520 | 480 | 3 | 20 | |
| VESA 640*480@75Hz | 37.500 | – | 840 | 640 | 64 | 120 | 31.500 |
| | 75.000 | – | 500 | 480 | 3 | 16 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| VESA 640*480@85Hz | 43.269 | – | 832 | 640 | 56 | 80 | 36.000 |
| | 85.008 | – | 509 | 480 | 3 | 25 | |
| VESA 800*600@56Hz | 35.156 | + | 1024 | 800 | 72 | 128 | 36.000 |
| | 56.250 | + | 625 | 600 | 2 | 22 | |
| VESA 800*600@60Hz | 37.879 | + | 1056 | 800 | 128 | 88 | 40.000 |
| | 60.317 | + | 628 | 600 | 4 | 23 | |
| VESA 800*600@72Hz | 48.077 | + | 1040 | 800 | 120 | 64 | 50.000 |
| | 72.188 | + | 666 | 600 | 6 | 23 | |
| VESA 800*600@75Hz | 46.875 | + | 1056 | 800 | 80 | 160 | 49.500 |
| | 75.000 | + | 625 | 600 | 3 | 21 | |
| VESA 800*600@85Hz | 53.674 | + | 1048 | 800 | 64 | 152 | 56.250 |
| | 85.061 | + | 631 | 600 | 3 | 27 | |
| MAC 832*624@75Hz | 49.725 | – | 1152 | 832 | 64 | 224 | 57.283 |
| | 74.550 | – | 667 | 632 | 3 | 39 | |
| VESA 1024*768@60Hz | 48.363 | – | 1344 | 1024 | 136 | 160 | 65.000 |
| | 60.004 | – | 806 | 768 | 6 | 29 | |
| VESA 1024*768@70Hz | 56.476 | – | 1328 | 1024 | 136 | 144 | 75.000 |
| | 70.069 | – | 806 | 768 | 6 | 29 | |
| VESA 1024*768@75Hz | 60.023 | + | 1312 | 1024 | 96 | 176 | 78.750 |
| | 75.029 | + | 800 | 768 | 3 | 28 | |
| VESA 1024*768@85Hz | 68.677 | + | 1376 | 1024 | 96 | 208 | 94.500 |
| | 84.997 | + | 808 | 768 | 3 | 36 | |
| 1024*768@72Hz | 57.700 | – | 1360 | 1024 | 136 | 144 | 78.472 |
| | 72.125 | – | 800 | 768 | 6 | 26 | |
| VESA 1152*864@75Hz | 67.500 | + | 1600 | 1152 | 128 | 256 | 108.000 |
| | 75.000 | + | 900 | 864 | 3 | 32 | |
| MAC 1152*870@75Hz | 68.681 | – | 1456 | 1152 | 128 | 144 | 100.000 |
| | 75.062 | – | 915 | 870 | 3 | 39 | |
| VESA 1280*960@60Hz | 60.000 | + | 1800 | 1280 | 112 | 312 | 108.000 |
| | 60.000 | + | 1000 | 960 | 3 | 36 | |
| 1280*960@75Hz | 75.000 | + | 1800 | 1280 | 112 | 312 | 130.000 |
| | 75.000 | + | 1000 | 960 | 3 | 36 | |
| VESA 1280*1024@60Hz | 63.981 | + | 1688 | 1280 | 112 | 248 | 108.000 |
| | 60.020 | + | 1066 | 1024 | 3 | 38 | |
| VESA 1280*1024@75Hz | 79.976 | + | 1688 | 1280 | 144 | 248 | 135.000 |
| | 75.025 | + | 1066 | 1024 | 3 | 38 | |
| | 75.025 | + | 1066 | 1024 | 3 | 38 | |

## 4.5 Power On/Off Sequence

### 4.5.1 Hardware Power ON

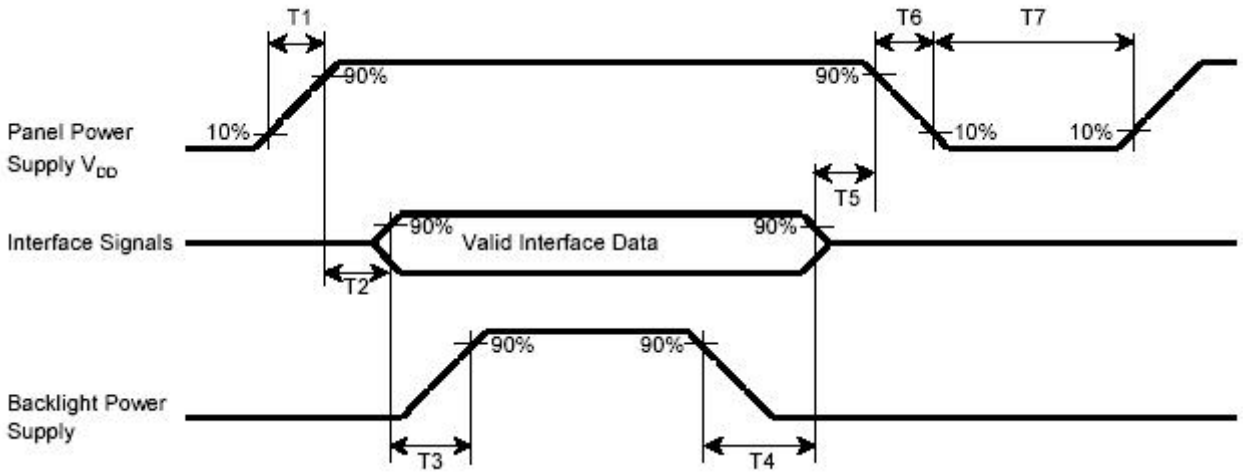
When power cord is plugged into AC socket, SMPS starts work and provides U105 with VCC5V. When VCC5V inputs, U105 resets circuit active, sets U105 all registers to preset modes, and then monitor goes into stand-by mode. That means hardware power on has been completed.

### 4.5.2 Software Power ON/OFF

When press power key, U105 # 90 recieves low pulse,and then U105 will do the power on/off.

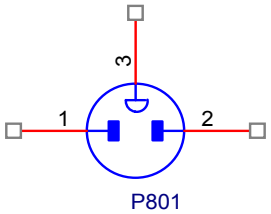
- If Power ON, U105 # 91(LED_Green) will send out Low potential, and then LED green on.
- If Power OFF, U105 # 91(LED_Green) will send out High potential, and then LED Off.

The Panel_Vcc, Backlight_En, CLK/DATA output to panel will follow the following sequency.




| T1 (ms) | T2 (ms) | T3 (ms) | T4 (ms) | T5 (ms) | T6 (ms) | T7 (ms) |
|---|---|---|---|---|---|---|
| **0.1~10** | **0.5~10** | **>200** | **>100** | **0~50** | **0.1~25** | **>1000** |

## 4.6 AC Outlet Pin Assignment




| Pin | Symbol | Description |
|---|---|---|
| 1 | L | Live |
| 2 | N | Neutral |
| 3 | E | GND |

## 4.7 Inner Connector Pin Assignment

### 4.7.1 CN501, CN502, CN503, CN504 (Connect to Panel Backlight, SM02B-BHSS-1-TB or equivalent)

| Pin | Symbol | Description |
|---|---|---|
| 1 | H.V. | High voltage for lamp |
| 2 | L.V. | Low voltage for lamp |

### 4.7.2 CN101 (Power BD to Interface BD)

| Pin No. | Symbol | Description |
|---|---|---|
| 1 | VCC5V | +5.1V INPUT |
| 2 | VCC5V | +5.1V INPUT |
| 3 | GND | GND |
| 4 | ON/OFF | CCFL on/off control |
| 5 | BRIGHTNESS | Panel luminance control (CCFL brightness) |
| 6 | GND | Ground |
| 7 | VOL | Volume control input |
| 8 | MUTE | Mute control input |

### 4.7.3 CN105 (Interface BD to Keypad)

| Pin No. | Symbol | Description |
|---|---|---|
| 1 | LED_ GREEN | Orange LED lighting control |
| 2 | LED_ ORANGE | Green LED lighting control |
| 3 | GND | Ground |
| 4 | KEY_POWER | DC power on/off control, |
| 5 | KEY_UP&▲ | OSD “▲” control to adjust value to increase, |
| 6 | KEY_DOWN&2 | Select control and auto adjustment control, |
| 7 | GND | OSD “▼” control to adjust value to decrease |
| 8 | KEY_1 | OSD menu and exit |

### 4.7.4 CN104 (Connect I/F BD to panel, FI-X30S-H or Equivalent)

| Pin No. | Symbol | Function |
|---|---|---|
| 1 | RXO0- | minus signal of odd channel 0(LVDS) |
| 2 | RXO0+ | plus signal of odd channel 0(LVDS) |
| 3 | RXO1- | minus signal of odd channel 1(LVDS) |
| 4 | RXO1+ | plus signal of odd channel 1(LVDS) |
| 5 | RXO2- | minus signal of odd channel 2(LVDS) |
| 6 | RXO2+ | plus signal of odd channel 2(LVDS) |
| 7 | GND | Ground |
| 8 | RXOC- | minus signal of odd clock channel (LVDS) |
| 9 | RXOC+ | plus signal of odd clock channel (LVDS) |
| 10 | RXO3- | minus signal of odd channel 3(LVDS) |

| | | |
|---|---|---|
| 11 | RXO3+ | plus signal of odd channel 3(LVDS) |
| 12 | RXE0- | minus signal of even channel 0(LVDS) |
| 13 | RXE0+ | plus signal of even channel 0(LVDS) |
| 14 | GND | Ground |
| 15 | RXE1- | minus signal of even channel 1(LVDS) |
| 16 | RXE1+ | plus signal of even channel 1(LVDS) |
| 17 | GND | Ground |
| 18 | RXE2- | minus signal of even channel 2(LVDS) |
| 19 | RXE2+ | plus signal of even channel 2(LVDS) |
| 20 | RXEC- | minus signal of even clock channel (LVDS) |
| 21 | RXEC+ | plus signal of even clock channel (LVDS) |
| 22 | RXE3- | minus signal of even channel 3(LVDS) |
| 23 | RXE3+ | plus signal of even channel 3(LVDS) |
| 24 | GND | Ground |
| 25 | GND | Ground |
| 26 | GND | Ground or Open |
| 27 | GND | Ground |
| 28 | VCC | Power supply (5.0 V) |
| 29 | VCC | Power supply (5.0 V) |
| 30 | VCC | Power supply (5.0 V) |

4.7.5 **CN103 (D-SUB Connector)**

| Pin | Symbol | Pin | Symbol | Pin | Symbol |
|---|---|---|---|---|---|
| 1 | Red video input | 6 | Red GND | 11 | GND |
| 2 | Green video input | 7 | Green GND | 12 | Serial data (SDA) |
| 3 | Blue video input | 8 | Blue GND | 13 | H / H+V SYNC |
| 4 | GND | 9 | +5V(from PC) | 14 | VSYNC |
| 5 | Cable Detect | 10 | GND | 15 | Data clock line (SCL) |

## 4.8 Key Parts Pin Assignment

### 4.8.1 IC802 (NCP1337, Power Control IC)

| Pin | Symbol | I/O | Description |
|---|---|---|---|
| 1 | BO | I | Brown−out and external triggering |
| 2 | FB | I | Sets the peak current setpoint |
| 3 | CS | I | Current sense input and overpower compensation adjustment |
| 4 | GND | | IC ground |
| 5 | DRV | O | Output driver |
| 6 | Vcc | I | IC supply |
| 7 | NC | N/A | N/A |
| 8 | HV | I | High−voltage pin |

### 4.8.2 IC501 (OZ9938GN, CCFL inverter controller IC)

| Pin No. | Symbol | I/O | Description |
|---|---|---|---|
| 1 | DRV1 | O | Drive output |
| 2 | VDDA | I | Supply voltage input |
| 3 | TIMER | I | Timing capacitor to set striking time and shut down delay time |
| 4 | DIM | I | Analog dimming or Internal LPWM dimming or external PWM pulse input for dimming function |
| 5 | ISEN | I | Current sense feedback |
| 6 | VSEN | I | Voltage sense feedback |
| 7 | OVPT | I | Over-voltage/over-current protection threshold setting pin |
| 8 | NC | | |
| 9 | NC | | |
| 10 | ENC | I | ON/OFF control of IC |
| 11 | LCT | I | Timing capacitor to set internal PWM dimming frequency and also a pin for analog dimming selection |
| 12 | SSTCMP | I | Capacitor for soft start time and loop compensation |
| 13 | CT | I | Timing resistor and capacitor for operation and striking frequency |
| 14 | GNDA | | Ground for analog signals |
| 15 | DRV2 | O | Drive output |
| 16 | PGND | | Ground for power paths |

### 4.8.3 U105(TSUM56AL-1)

| Pin | Symbol | I/O | Description |
|---|---|---|---|
| 1 | NC | | Not connected |
| 2 | GND | | Ground |
| 3 | NC | | Not connected |
| 4 | NC | | Not connected |
| 5 | GND | | Ground |
| 6 | NC | | Not connected |
| 7 | NC | | Not connected |

| | | | |
|---|---|---|---|
| 8 | AVDD_DC | I | ADC Power |
| 9 | NC | | Not connected |
| 10 | NC | | Not connected |
| 11 | GND | | Ground |
| 12 | NC | | Not connected |
| 13 | NC | | Not connected |
| 14 | AVDD_DC | I | ADC Power |
| 15 | REXT | | External resistor 390 ohm to AVDD_ADC |
| 16 | AVDD_PLL | I | PLL Power |
| 17 | BIN0M | I | Reference ground for analog blue input |
| 18 | BIN0P | I | Analog blue input |
| 19 | GIN0M | I | Reference ground for analog green input |
| 20 | GIN0P | I | Analog green input |
| 21 | SOGIN0 | I | Sync-on-green input |
| 22 | RIN0M | I | Reference ground for analog red input |
| 23 | RIN0P | I | Analog red input |
| 24 | AVDD_ADC | I | ADC Power |
| 25 | REFM | | Internal ADC bottom de-coupling pin |
| 26 | REFP | | Internal ADC top de-coupling pin |
| 27 | HSYNC0 | I | Analog HSYNC input |
| 28 | VSYNC0 | I | Analog VSYNC input |
| 29 | GND | | Ground |
| 30 | DDCA_SDA/RS232_TX | I/O | DDC Data for Analog Interface; 4mA driving strength/UART Transmitter/GPIO |
| 31 | DDCA_SCL/RS232_RX | I/O | DDC Clock for Analog Interface/UART Receiver/GPIO |
| 32 | VDDP | I | Digital Output Power |
| 33 | GND | | Ground |
| 34 | VDDC | I | Digital Core Power |
| 35 | GPIO_P15/PWM0 | I/O | General Purpose Input/Output; 4mA driving strength/Pulse Width Modulation Output; 4mA driving strength |
| 36 | NC | | Not Connected |
| 37 | SDO | I | SPI Flash Serial Data Output |
| 38 | SCZ | O | SPI Flash Chip Select |
| 39 | SCK | O | SPI Flash Serial Clock |
| 40 | SDI | O | SPI Flash Serial Data Input |
| 41 | NC | | Not Connected |
| 42 | NC | | Not Connected |
| 43 | GPIO_P11/I2C_MDA | I/O | General Purpose Input/Output; 4mA driving strength/I2C Master Data |
| 44 | GPIO_P10/I2C_MCL | I/O | General Purpose Input/Output; 4mA driving strength/I2C Master Clock |
| 45 | NC | | Not Connected |
| 46 | NC | | Not connected |
| 47 | NC | | Not connected |
| 48 | GPIO_P27/PWM1 | I/O | General Purpose Input/Output; 4mA driving strength/Pulse Width Modulation Output; 4mA driving strength |
| 49 | VDDP | I | Digital Output Power |
| 50 | GND | | Ground |
| 51 | VDDC | I | Digital Core Power |
| 52 | MODE[0] | I | Chip Configuration Input |
| 53 | MODE[1] | I | Chip Configuration Input |
| 54 | LVA3P | O | A-Link Positive LVDS Differential Data Output |
| 55 | LVA3M | O | A-Link Negative LVDS Differential Data Output |
| 56 | VDDP | I | Digital Output Power |
| 57 | GND | | Ground |
| 58 | LVACKP | O | A-Link Positive LVDS Differential Clock Output |
| 59 | LVACKM | O | A-Link Negative LVDS Differential Clock Output |

| | | | |
|---|---|---|---|
| 60 | LVA2P | O | A-Link Positive LVDS Differential Data Output |
| 61 | LVA2M | O | A-Link Negative LVDS Differential Data Output |
| 62 | LVA1P | O | A-Link Positive LVDS Differential Data Output |
| 63 | LVA1M | O | A-Link Negative LVDS Differential Data Output |
| 64 | LVA0P | O | A-Link Positive LVDS Differential Data Output |
| 65 | LVA0M | O | A-Link Negative LVDS Differential Data Output |
| 66 | VDDC | I | Digital Core Power |
| 67 | LVB3P | O | B-Link Positive LVDS Differential Data Output |
| 68 | LVB3M | O | B-Link Negative LVDS Differential Data Output |
| 69 | LVBCKP | O | B-Link Positive LVDS Differential Clock Output |
| 70 | LVBCKM | O | B-Link Negative LVDS Differential Clock Output |
| 71 | LVB2P | O | B-Link Positive LVDS Differential Data Output |
| 72 | LVB2M | O | B-Link Negative LVDS Differential Data Output |
| 73 | LVB1P | O | B-Link Positive LVDS Differential Data Output |
| 74 | LVB1M | O | B-Link Negative LVDS Differential Data Output |
| 75 | VDDP | I | Digital Output Power |
| 76 | GND | | Ground |
| 77 | LVB0P | O | B-Link Positive LVDS Differential Data Output |
| 78 | LVB0M | O | B-Link Negative LVDS Differential Data Output |
| 79 | GND | | Ground |
| 80 | BYPASS | | For External Bypass Capacitor |
| 81 | NC | | Not connected |
| 82 | VDDC | I | Digital Core Power |
| 83 | GND | | Ground |
| 84 | RST | I | Chip Reset; High Reset |
| 85 | GPIO_P12 | I/O | General Purpose Input/Output; 4mA driving strength |
| 86 | PWM1/GPIO_P25 | I/O | Pulse Width Modulation Output; 4mA driving strength/General Purpose Input/Output; 4mA driving strength |
| 87 | RSTN | I | Chip Reset; Low Reset |
| 88 | GPIO_P00/SAR1 | I/O | General Purpose Input/Output; 4mA driving strength/SAR ADC Input |
| 89 | GPIO_P01/SAR2 | I/O | General Purpose Input/Output; 4mA driving strength/SAR ADC Input |
| 90 | GPIO_P02/SAR3 | I/O | General Purpose Input/Output; 4mA driving strength/SAR ADC Input |
| 91 | GPIO_P06 | I/O | General Purpose Input/Output; 6/12mA programmable driving strength |
| 92 | GPIO_P07 | I/O | General Purpose Input/Output; 6/12mA programmable driving strength |
| 93 | PWM0/GPIO_P26 | I/O | Pulse Width Modulation Output; 4mA driving strength/General Purpose Input/Output; 4mA driving strength |
| 94 | GPIO_P13 | I/O | General Purpose Input/Output; 4mA driving strength |
| 95 | GPIO_P14 | I/O | General Purpose Input/Output; 4mA driving strength |
| 96 | XIN | I | Crystal Oscillator Input |
| 97 | XOUT | O | Crystal Oscillator Output |
| 98 | AVDD_MPLL | I | MPLL Power |
| 99 | GPIO_P16/PWM2 | I/O | General Purpose Input/Output; 4mA driving strength/ Pulse Width Modulation Output; 4mA driving strength |
| 100 | NC | | Not connected |

# 5. Adjustment Procedure

## 5.1 Key Function Description

| CONTROL KEY | KEYS FUNCTION |
|---|---|
| [AUTO] [2] | By pressing [AUTO] key, “Auto Image Adjust” is performed |
| [MENU] [1] | By pressing [MENU] key, Main menu display |
| [▼] [▲] | A. When “MENU OSD” display, press these keys to change the contents of an adjustment item, or change an adjustment value<br>B. When “MENU OSD” is un-display, press these keys to change brightness and contrast |
| [POWER] | Power on or power off the monitor |

## 5.2 Hot Key Operation

| Hot Key Function | |
|---|---|
| Item | Function Detail |
| [▲] + [▼] | Recall Contrast or Brightness while in the Contrast or Brightness adjustment; |
| | Recall both Contrast and Brightness when the OSD is not open |
| [1] +[2] | Toggle 720x400 and 640x400 mode when input 720x400 or 640x400 mode |
| [1] + [▼] + [▲]<br>(keep pushing 5 sec) | White Balance (Not shown on user’s guide) |
| [1] + [▼] | Power Lock |
| [1] + [▲] | OSD Lock |
| [▼] + [▲]+ [⏻] | Enter Factory Mode |
| Remark: All the function above are only available while OSD off | |

## 5.3 OSD Control

### 5.3.1 OSD table

| Layer 1 | Layer 2 | Layer 3 |
|---|---|---|
| Auto Image Adjust | | |
| Contrast/Brightness | Contrast (+ / -) | |
| | Brightness (+ / -) | |
| Audio | Volume | Volume (+ / -) |
| | Mute | On/Off |
| Color Adjust | sRGB | |
| | 9300K | |
| | 6500K | |
| | 5400K | |
| | User Color | Red (+ / -) |
| | | Green (+ / -) |
| | | Blue (+ / -) |

| | | |
|---|---|---|
| Information | | |
| Manual Image Adjust | H/V Position | H Position (+ / -) |
| | | V Position (+ / -) |
| | H Size | + / - |
| | Fine Tune | + / - |
| | Sharpness | + / - |
| Setup Menu | Language Select | English |
| | | French |
| | | German |
| | | Italian |
| | | Spanish |
| | | Finnish |
| | | Japanese |
| | | Simplified Chinese |
| | | Traditional Chinese |
| | Resolution Notice | On/Off |
| | OSD Position | H Position (+ / -) |
| | | V Position (+ / -) |
| | OSD Time Out | |
| | OSD Background | On/Off |
| Memory Recall | | |

### 5.3.2 OSD lock Menu function

| OSD Lock Menu Function Check | | |
|---|---|---|
| **Item** | **Method** | **Phenomenon** |
| Activate OSD lock | [1] + [▲] 10S | Press any of buttons"1", "▼", "▲", "2" will appear "OSD Locked" 3s |
| Deactivate OSD lock: | [1] + [▲] 10S(again) | |
| NOTICE:<br>When the OSD is locked will lock all functions.<br>Status bar indicating OSD Lock or Unlock is in progress and when complete it will indicate “OSD Locked”<br>OSD Lock should not lock Power Button and Power Lock function | | |

### 5.3.3 Power lock Menu function

| Power Lock Menu Function Check | | |
|---|---|---|
| **Item** | **Method** | **Phenomenon** |

| | | |
|---|---|---|
| Activate Power Lock | [1] + [▼] 10S | Can not turn off the LCD;<br>Press the power button will appear "Power Button Locked" OSD 3s;<br>LCD would automatically turn back "On" when power is restored after a power failure |
| Deactivate Power Lock | [1] + [▼] 10S(again) | |
| NOTICE:<br>Status bar indicating Power Button lock or unlock is in progress and when complete it will indicate “Power Button Locked”<br>Power should only be lockable in the “On State” | | |

### 5.3.4 Resolution notice function

| Resolution Notice Menu | | |
|---|---|---|
| **Item** | **Method** | **Phenomenon** |
| Activate Resolution Notice Menu | Resolution Notice OSD should show on screen after changing to non-native mode for 30 sec,<br>And it should disappear after 10s or by pushing button [1] or [2] | ------ |
| Deactivate Resolution Notice Menu | Push button [2] under Resolution Notice OSD, select Disable | ------- |

### 5.3.5 Factory Mode Introduction

When input the signal, press “power key” to turn off the monitor. Press” **[▼] +[▲] +[⏻]** “at the same time so as to enter factory mode. After power on, press ‘’Menu[1]’’ key, you can see the Factory menu.

INL-V0 : Currently using panel model name
V3 060922 : Currently using firmware version information.
Auto Color : Automatically calibrate chip ADC parameter by using chip internal DAC
Color Temperature : The R, G, B of 9300K and 6500K and 5400K and User Mode Colors are all generated from scaling back end.

## 5.4 Burn-in pattern

If it is a new monitor, and in factory mode, if no VGA signal input, Burn-in pattern will self generate automatically. Burn in patterns are: full Red, Green, Blue, White and Black. You can not escape from Burn-in pattern until plug in VGA Cable or press the power key to turn the monitor off and then turn it on.

## 5.5 Auto Color (Automatically calibrate chip ADC parameter by using chip

## internal DAC)

If it is a new-built set and it is first time to do the “auto color”, please confirm the following steps:

-Connect the VGA cable with the standard video pattern generator and display 5-mosic pattern on the monitor.

- Press “Power” to power off the monitor.

- Press” **[▼] +[▲] +[⏻]** “simultaneously to enter factory mode.

- Press ‘’Menu[1]’’, then press ‘’Auto[2]’’ to execute Auto color item.

- After the “Auto Color” process finished, please press “Power” to restart monitor.

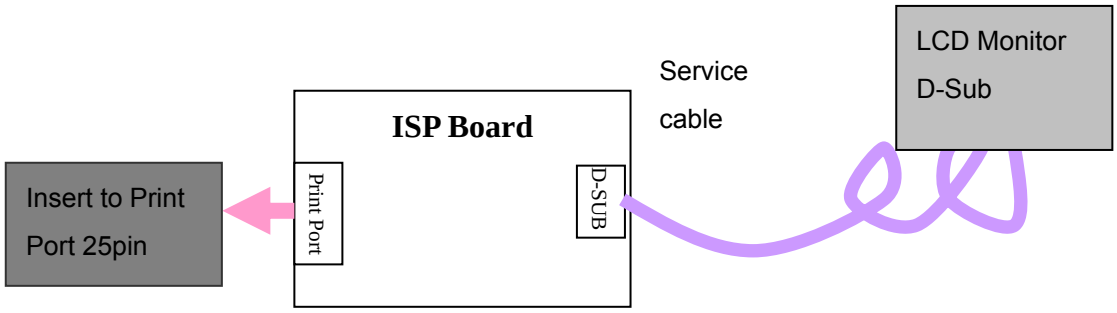
## 5.6 EDID (Rewrite EDID data to EEPROM)

If we need to rewrite the EEPROM data, please confirm the following steps.

1. Plug in VGA Cable; we can rewrite the EDID data to EEPROM by using “EDID Rewrite” program.
2. If the “EDID Rewrite” process finished, please pull out VGA cable and press ‘’2’’+’’▲’’ at the same time.
3. Pull out AC power cable or press power key to restart.

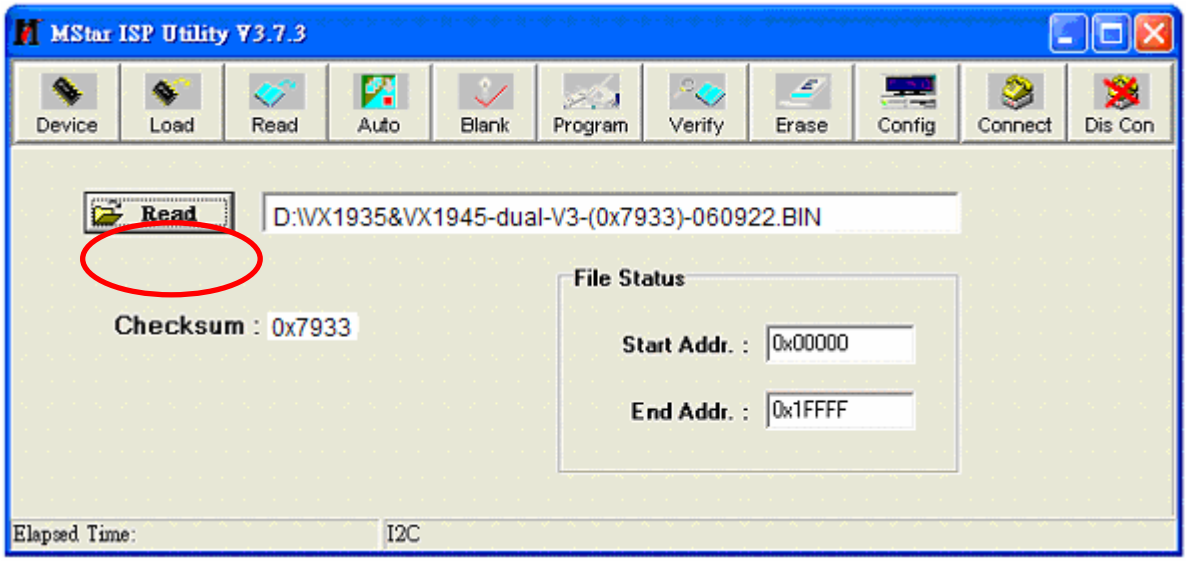
## 5.7 Upload firmware to MCU via VGA Cable

### 5.7.1 Connect ISP board between monitor and PC as below configure

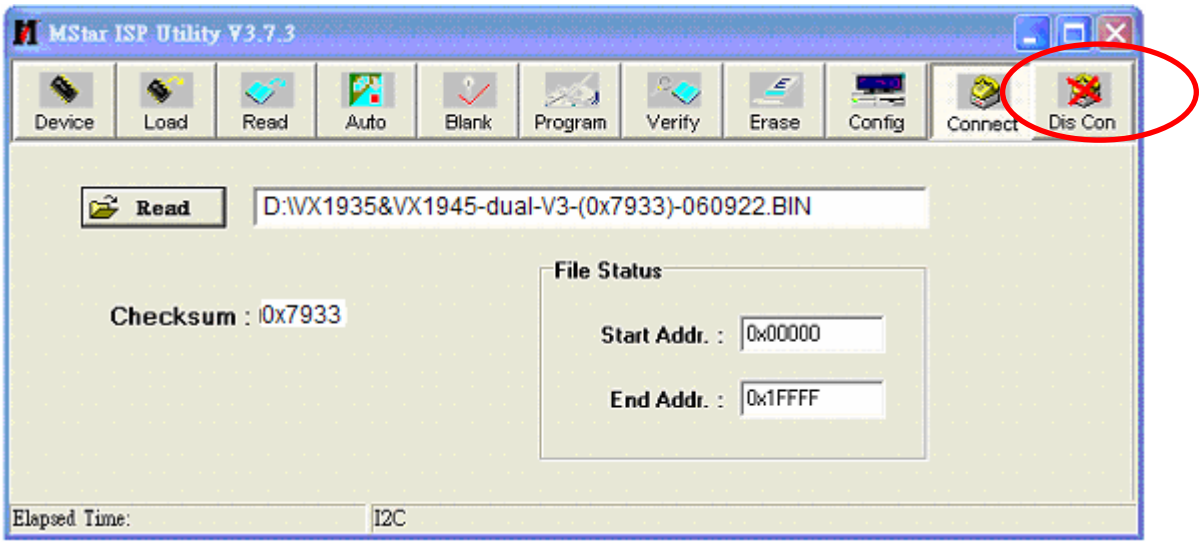



### 5.7.2 Using mStar ISP Tool Update FW:

**(1). Select “Read”, Choose the corresponding firmware, load to MCU.**

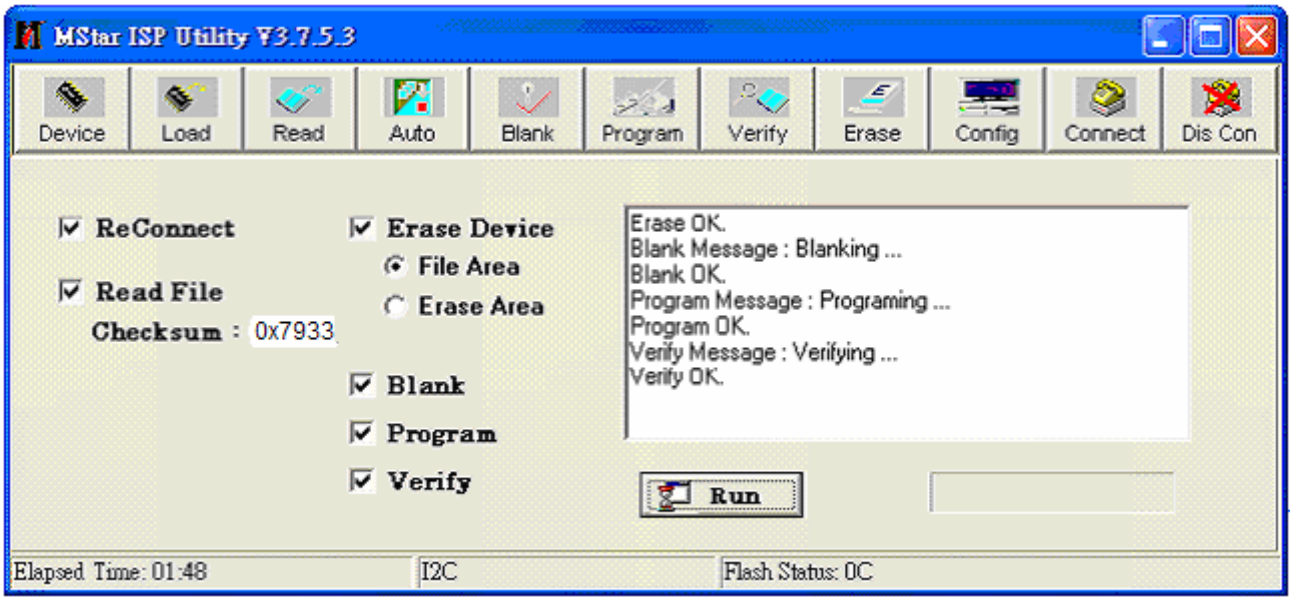


**(2). Select “Connect”, auto connect for ISP.**




**(3). Select “Run”, start ISP.**

**(4). When the picture show “Verify OK”, ISP finished.**



## 5.7.3 After repair, to ensure the quality you should do the following test and adjustment

<table>
<tr><th>Item</th><th>Content</th><th>Equipment</th></tr>
<tr><td>Test OSD function</td><td>1.Signal is set as 1280x1024@60Hz<br>2. LCM button are from left to right, checking whether each single function key and compound function key can be worked.</td><td>Chroma<br>Signal Generator</td></tr>
<tr><td>Contrast Check</td><td>1. Set input mode to 1280x1024@60Hz<br>2. Set Pattern to 32 gray shades<br>3. Set contrast to the max. The brightest 6~8 shades brightness cannot be distinguished.</td><td>Chroma<br>Signal Generator</td></tr>
<tr><td>Color Temperature</td><td>1. Do “Auto color” at 640 x 480@60Hz, 5-Mosic pattern<br>2. Measure color temperature, check it complies with the following temperature:<br>5400K x=0.335 +/- 0.02, y=0.350 +/- 0.02<br>6500K x=0.313 +/- 0.02, y=0.329 +/- 0.02<br>9300K x=0.283 +/- 0.02, y=0.298 +/- 0.02</td><td>Chroma Signal Generator and color analyzer</td></tr>
<tr><td>Modes switching check</td><td>1. Use Chroma Pattern Generator to make sequence.<br>VESA (640x480 800x600 1024x768 1280x1024), MAC 832x624<br>DOS (640x350 720x400), the detail supported modes and power saving signal.<br>2. Confirm the above timing modes must be full screen and the picture must be normal.<br>3. LED is Orange at power saving mode.</td><td>Chroma Signal Generator</td></tr>
<tr><td>Y measurement at default setting</td><td>1. Set brightness to default value 100 and contrast to default value 70 at 6500K<br>2. At full white patter, Measure Y, which should be ≥ 250cd/m²</td><td>Chroma Signal Generator and Color Analyzer</td></tr>
<tr><td>Panel Flicker check</td><td>1. Mode: 1280x1024@60Hz<br>2. Set Brightness& contrast to default value<br>3. Do “Auto Image Adjust”<br>4. Shut down PC to check whether there’s glitter on the center of the picture.</td><td>Equipment::<br>Chroma Signal Generator & PC</td></tr>
<tr><td>Power saving</td><td>1. Mode: 1440x900@60Hz<br>2. Pattern: full white<br>3. Brightness: Max.<br>4. Contrast: Default<br>5. Check power consumption at each modes
<table>
<tr><th>State</th><th>Power Consumption</th><th>LED color</th></tr>
<tr><td>Normal</td><td>≤ 42W</td><td>Blue</td></tr>
<tr><td>Stand By</td><td>< 2W</td><td>Orange</td></tr>
<tr><td>Power Key Off</td><td>＜1W</td><td>No</td></tr>
</table></td><td>Chroma signal generator and Power meter<br>AC input: 230V/50Hz</td></tr>
</table>

## Packing For Shipping

### 1. Packing Procedure

**1.1 Paste protection film to protect the monitor. (Figure 1)**

**1.2 Put the monitor in the PE bag and seal the bag with tape. (Figure 2)**

**Figure 1**

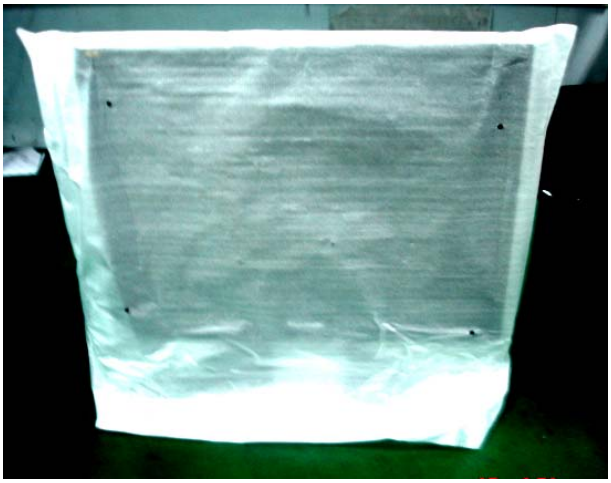


**Figure 2**

**1.3 Put the cushions on the monitor.**

**1.4 Place the monitor into the carton and then put all the accessories into the carton. At last, close the carton and seal it with tape. (Figure 3)**

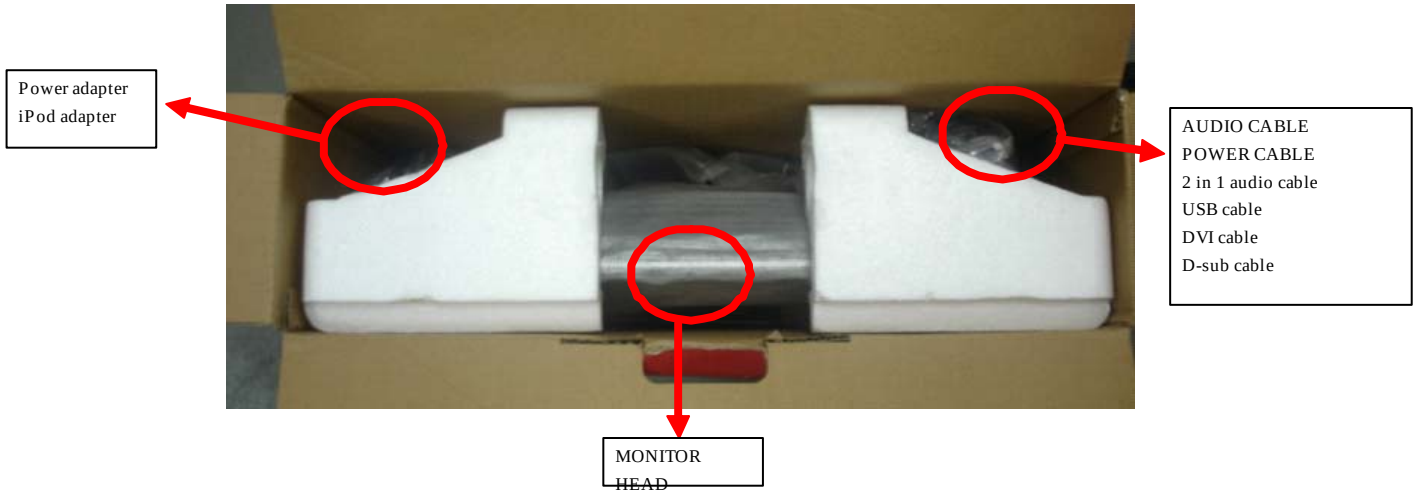



**Figure 3**

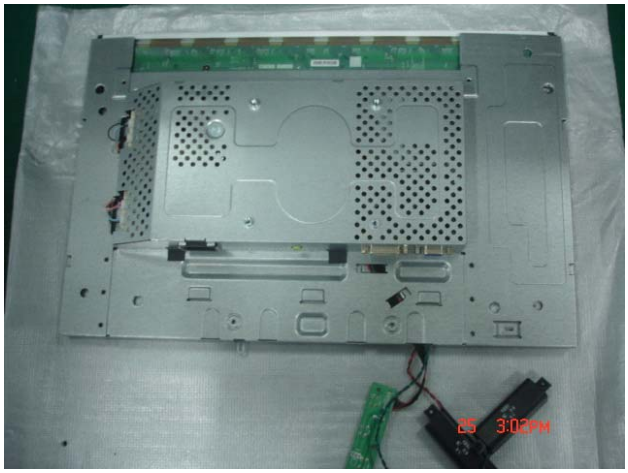
## Disassembly Procedure

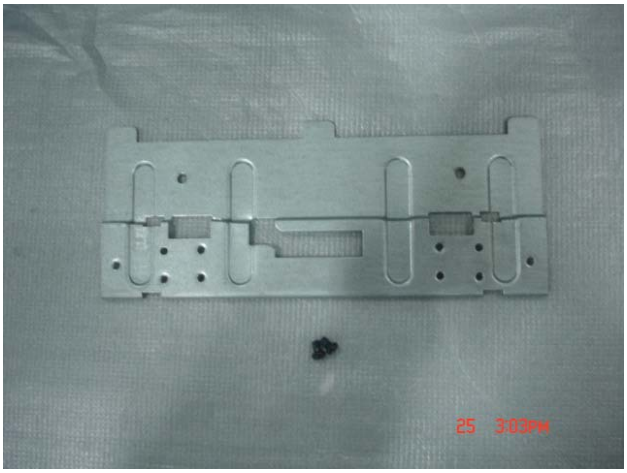
Hinge Cover

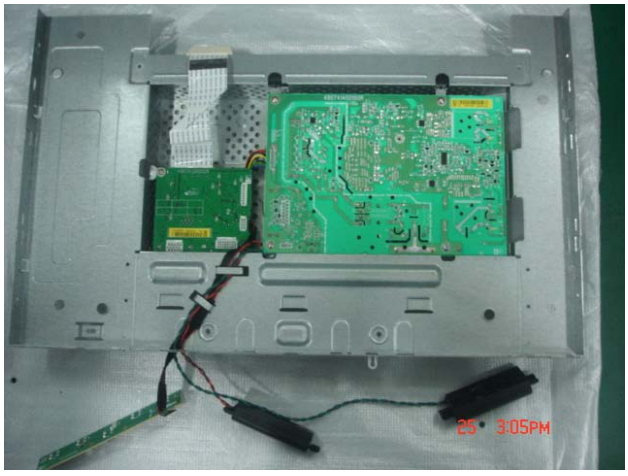
iBox

Front Cover

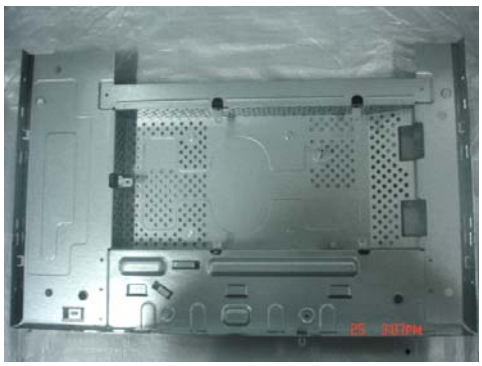
BACK COVER







PANEL

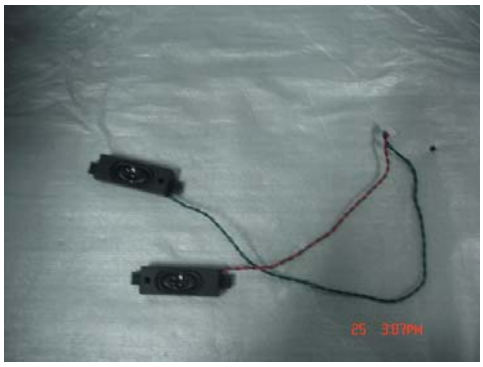


CHASSIS

I/F BOARD

P/I BOARD

KEYPAD BOARD



SPEAKER

LVDS

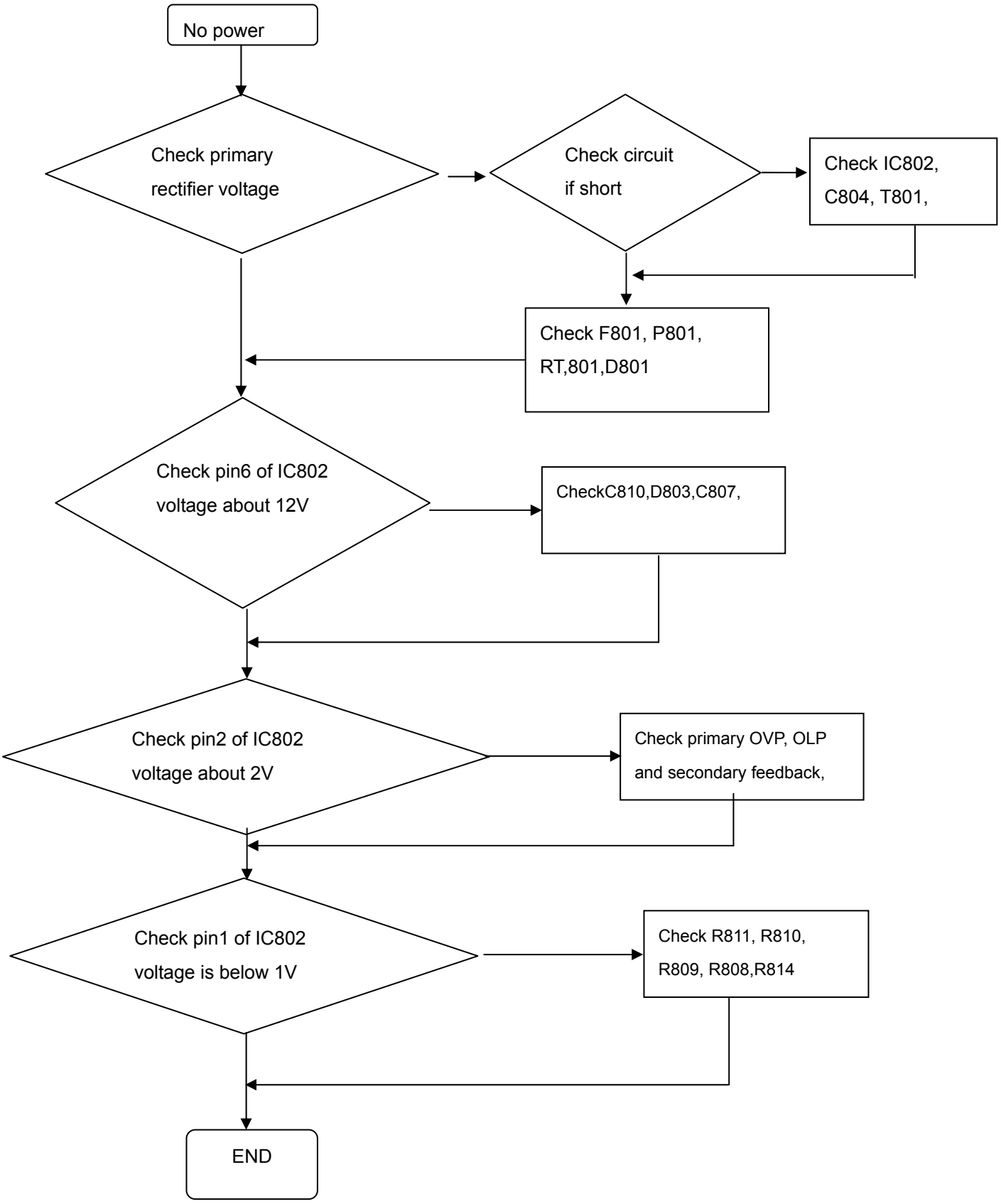
KEY-POWER CABLE

# 6. Troubleshooting Flow Chart

### 6.1. Common Acknowledge

- If you change the interface board, be sure that the U103, U105, U106 and U108 these three components also changed to the new I/F board because there was program inside. If not, please re-write EDID and upload firmware into U106 via VGA Cable.
- If you adjust clock and phase, please do it at the condition of Windows shut down pattern.
- If you confirm the R.G.B. color is normal or not, please do it under 16-grey scalar pattern.
- This LCM is analog interface. So if the entire screen is an abnormal color that means the problem happen in the analog circuit part, if only some scale appears abnormal color that stand the problem happen in the digital circuit part.
- If you check the H/V position, please use the crosshatch pattern.
- This LCM support more than 30 timing modes, if the input timing mode is out of specification, the picture may appears abnormally.
- If brightness uneven, repairs Inverter circuit or change a new panel.
- If you find the vertical line or horizontal line lost on the screen, please change panel.
- If you find the speaker don’t working, please don’t plug in audio cable, unless change new speaker.

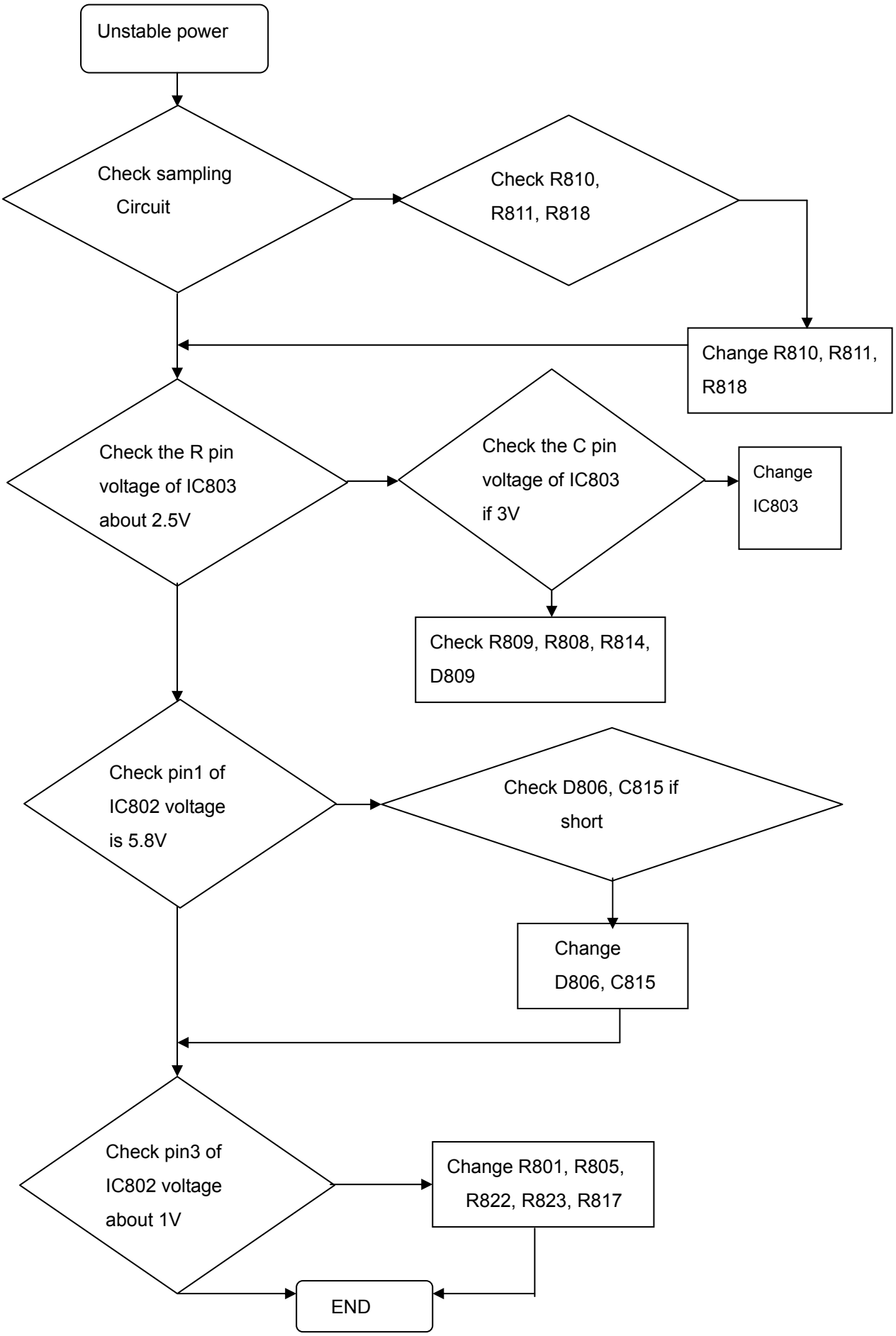
### 6.2. No Power & Power LED Off


No power
Check primary rectifier voltage
Check circuit if short
Check IC802, C804, T801,
Check F801, P801, RT,801,D801
Check pin6 of IC802 voltage about 12V
CheckC810,D803,C807,
Check pin2 of IC802 voltage about 2V
Check primary OVP, OLP and secondary feedback,
Check pin1 of IC802 voltage is below 1V
Check R811, R810, R809, R808,R814
END

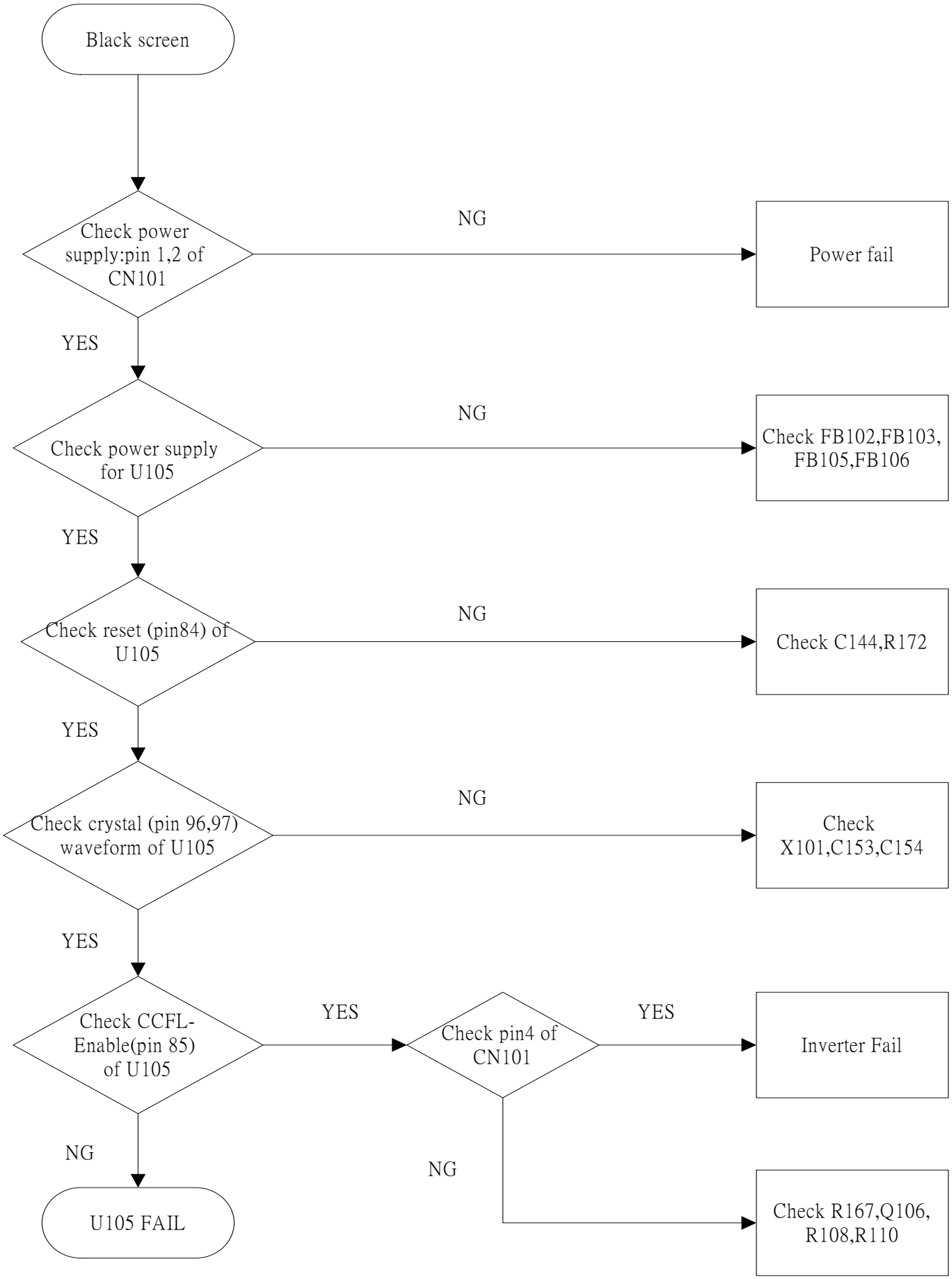
### 6.3. DC output voltage is unstable

Unstable power
Check sampling Circuit
Check R822, R823, R824
Change R822, R823, R824
Check the R pin voltage of IC803 about 2.5V
Check the C pin voltage of IC803 if 3V
Change IC803
Check R819, R820
Check pin2 of IC802 voltage is 3V
Check R818, D804, C807 if short
Change R818, D804, C807
Check pin1 of IC802 voltage below 1V
Change R808, R 809, R810, R 811, R815,
END

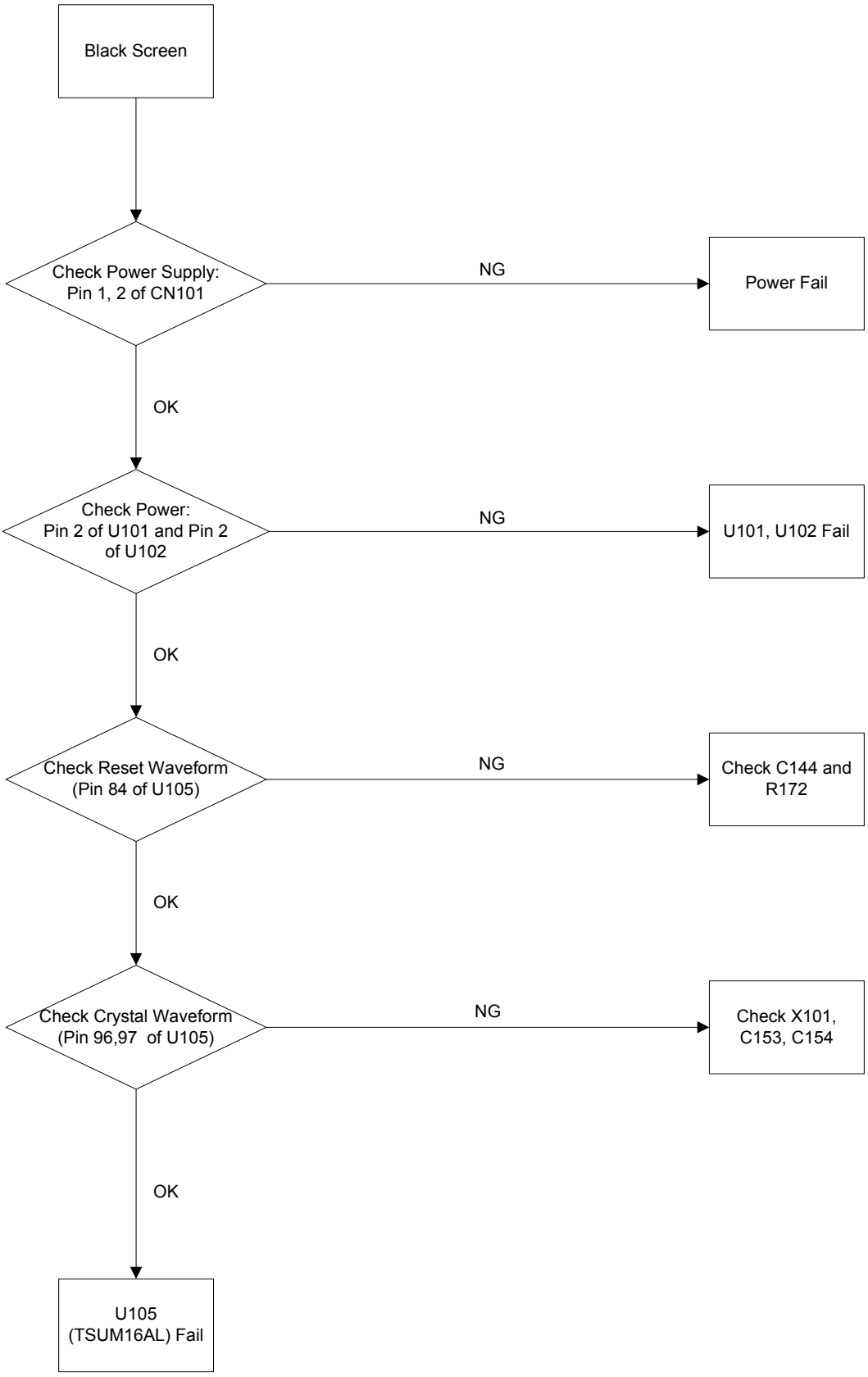
### 6.4. Output power is unstable


Unstable power
Check sampling Circuit
Check R810, R811, R818
Change R810, R811, R818
Check the R pin voltage of IC803 about 2.5V
Check the C pin voltage of IC803 if 3V
Change IC803
Check R809, R808, R814, D809
Check pin1 of IC802 voltage is 5.8V
Check D806, C815 if short
Change D806, C815
Check pin3 of IC802 voltage about 1V
Change R801, R805, R822, R823, R817
END

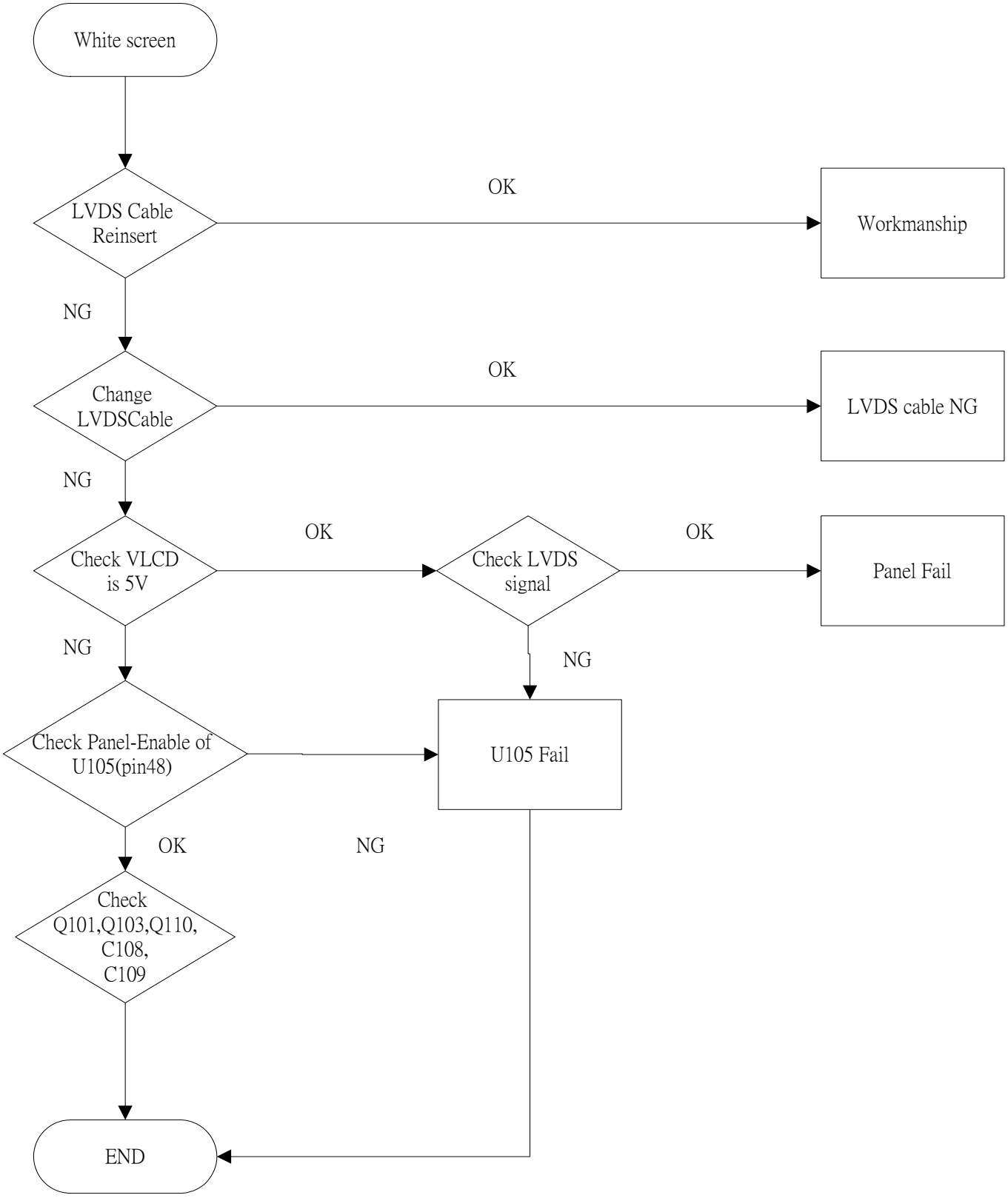
### 6.5. Backlight can't be turned on



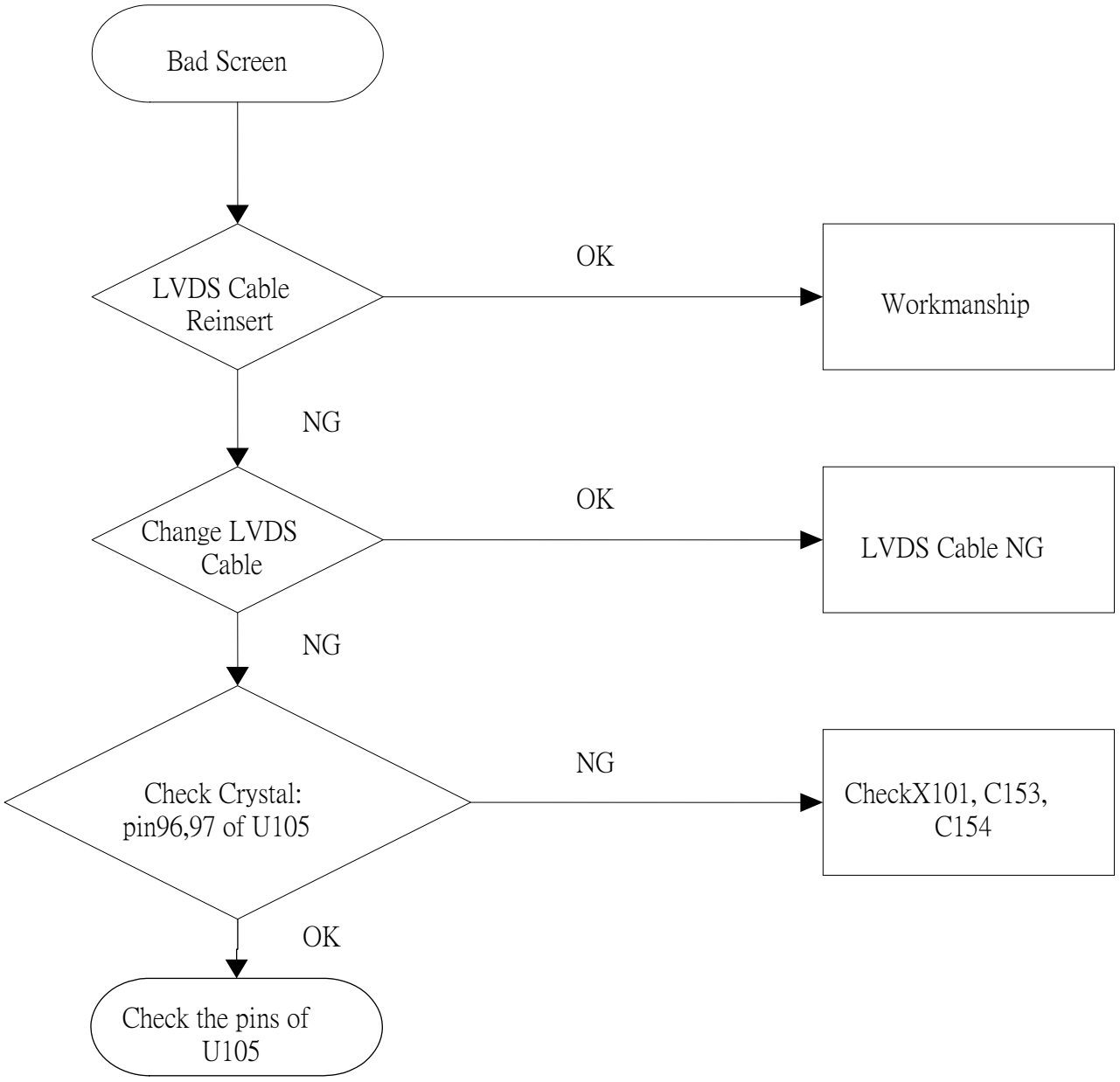
### 6.6. Black Screen and backlight turn on



### 6.7. White Screen



### 6.8. Bad Screen



# 7. Recommended Spare Parts List

## RECOMMENDED SPARE PARTS LIST (VX1945wm-3)

**ViewSonic Model Number: VS11444**

**Serial No. Prefix: QCY** **Rev: 1b**

| Item | Description | | ECR/ECN | ViewSonic P/N | Ref. P/N | Location | Universal number# |
|---|---|---|---|---|---|---|---|
| 1 | **Accessories:** | Power Cord 10A/250V 6FT (Australia) | | A-00003671 | 453070800420R | | |
| 2 | **[Adapter, Remote** | Power Cord 16A/250V 6FT (Europe) | | A-00003674 | 453070800210R | | |
| 3 | **Control]** | Power Cord 5A/250V (Singapore) | | A-00003675 | 453070800230R | | |
| 4 | | Power Cord, 10A/250V BLK 6FT (China) | | A-00005255 | 453070800170R | | |
| 5 | | Power Cord 10A/125V BLK 6FT UL/CSA USA RoHS | | A-00006679 | 453070800250R | | |
| 6 | | Power Cord 7A/125V 6FT (Taiwan) | | A-00006733 | 453070800480R | | |
| 7 | | Power Cord 16A/250V 6FT (Korea) | | A-00006734 | 453070800500R | | |
| 8 | | Adapter, Kit Power for Base (CHINA) | | A-00008068 | 704300000200R | | |
| 9 | | Adapter, Kit Power for Base (US & TW) | | A-00008069 | 704300000250R | | |
| 10 | | Adapter, Kit Power for Base (EU) | | A-00008070 | 704300000210R | | |
| 11 | | Adapter, Kit ipod | | A-00008071 | 704300000300R | | |
| 12 | | Kit Accessory | | A-00008072 | 703000004400R | | |
| 13 | **PC Board** | Interface Board | | B-00008169 | 790741300600R | | |
| 14 | **Assembly: [All** | Key Board | | B-00008170 | 790741500000R | | |
| 15 | **PCBA]** | Sub Board - P/I Board | | B-00008171 | 790741400600R | | |
| 16 | | Front Panel | | C-00008190 | 714030007910R | | |
| 17 | **Cabinets:** | Back Cover | | C-00008191 | 714050007910R | | |
| 18 | **[Front Panel, Back Cover, Base]** | Base Assembly + Stand | Updated VS Part # on 11/27/06 | ~~C-00008193~~ C-00006106 | 714010008500R | | |
| 19 | **Cables: [All Cables]** | Cable, D-Sub , SZ40 RoHS | | CB-00005254 | 453010100100R | | |
| 20 | | Audio Cable (1P 6FT) | | CB-00008002 | 453030300120R | | |
| 21 | | Video Cable - DVI-D 18+1P MALE 6FT | | CB-00008070 | 453030300180R | | |
| 22 | | Flat Cable - LVDS FFC 30P 158mm, ROHS | | CB-00008071 | 430303000690R | | |
| 23 | | Wire - 8P 200mm UL1571#28 ROHS | | CB-00008072 | 430300800800R | | |
| 24 | | Audio Cable - 1P TO 2P 6FT,RoHS | | CB-00008074 | 453030300310R | | |
| 25 | | USB Cable - 5FT BLACK, RoHS | | CB-00008075 | 453030300320R | | |
| 26 | **Electronic** | LCD Panel 19" | | E-00008016 | 631102090600R | | |
| 27 | **Components: [CRT-** | LCD Panel 19" Substitute 1 | | E-00008171 | 631102090610R | | |
| 28 | **EEPROM, Fly Back** | LCD Panel 19" Substitute 2 | | E-00008172 | 631102090720R | | |
| 29 | **Hardware:** | Hinge - Cover-Left | | HW-00008055 | 501020210460R | | |
| 30 | | Hinge - Cover Right | | HW-00008056 | 501020210560R | | |
| 31 | **Packing Material:** | PE Bag - L620xW510xT0.6mm | | P-00008170 | 506120301700R | | |
| 32 | **[Box, Foam]** | Bag, Plastic W(575+300)xL1125xT0.05mm | | P-00008172 | 506120006300R | | |
| 33 | | Craft Box | | P-00008184 | 506020012510R | | |
| 34 | | Foam - EPS (Left) | | P-00008185 | 506040010120R | | |
| 35 | | Foam - EPS (Right) | | P-00008186 | 506040010130R | | |
| 36 | | Generic Foam Set | | P-00001347 | 30833 | | |
| 37 | | Generic Box | | P-00002515 | 20653 | | |

Remark 1: Above listed items are examples, supplier can expand the rows to add more necessary items.

Remark 2: All revised RSPLs with newly added items or any change made should be highlighted and correlated with the ECN/ECR approved by ViewSonic Corporation. This is to eliminate repeated cross checks of each item between this version and prior versions.

# BOM LIST (VX1945wm-3)

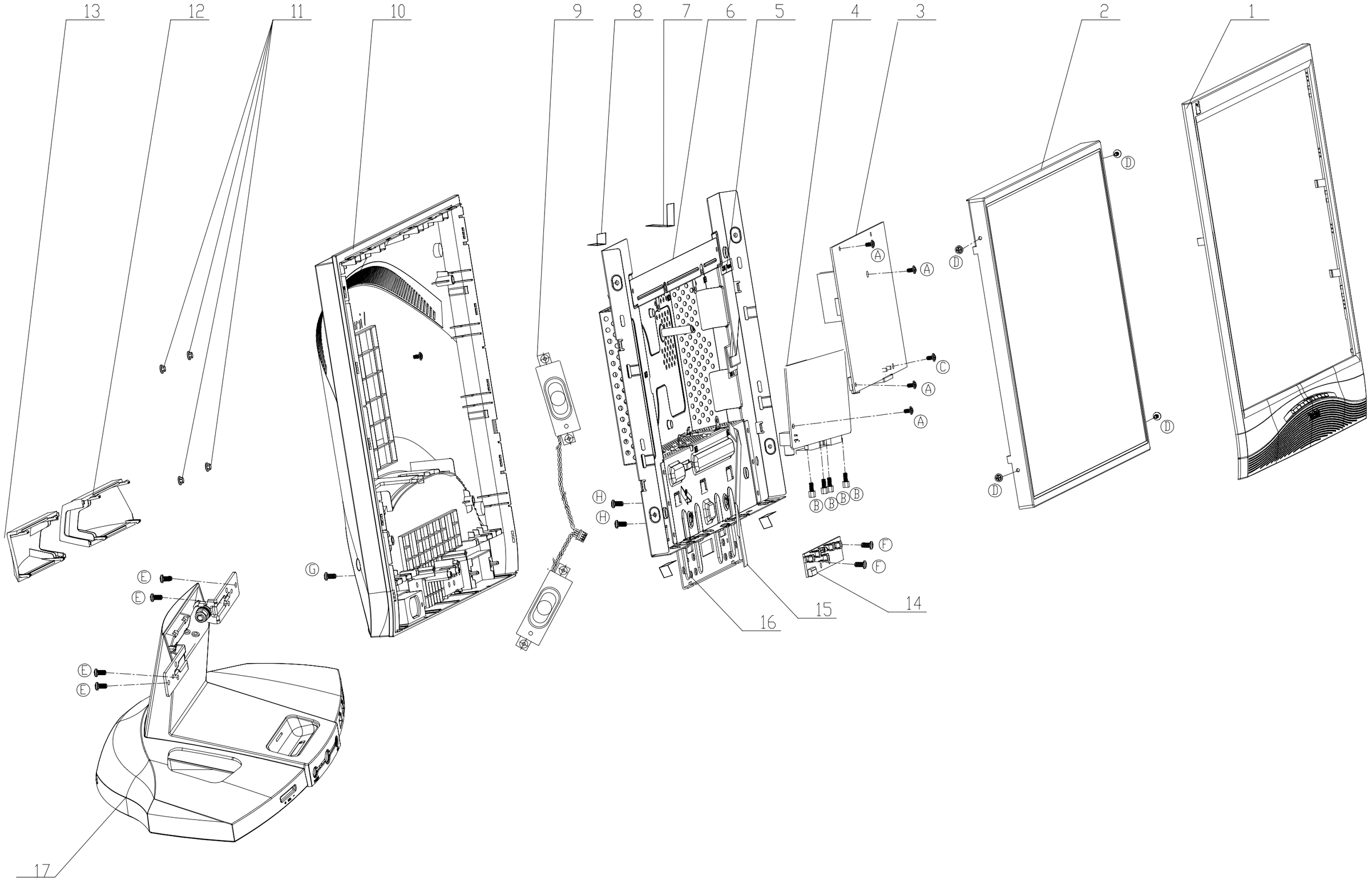
**ViewSonic Model Number: VS11444**

**Rev: 1b**

**Serial No. Prefix: QCY**

| Item | ViewSonic P/N | Ref. P/N | Description | Location | Universal number# | Q'ty |
|---|---|---|---|---|---|---|
| 1 | N/A | 506380002100R | TAPE,WRAPPING TYPE(VIEWSONIC),50mmx75M,L | | | 0.01 |
| 2 | P-00008170 | 506120301700R | BAG,EPE+PE,L620xW510xT0.6mm, LE1925 | | | 1 |
| 3 | N/A | 506431003100R | FILM,PROTECTION,UNPRINTED,430x280x0.1mm, | | | 1 |
| 4 | N/A | 506431000300R | FILM,PE 500mmx900M ROHS | | | 0.002 |
| 5 | P-00008184 | 506020012510R | CARTON,VIEWSONIC(VX1945), LP1911 | | | 1 |
| 6 | P-00008185 | 506040010120R | CUSHION,EPS-L,(VX1945), LP1911 | | | 1 |
| 7 | P-00008186 | 506040010130R | CUSHION,EPS-R,(VX1945),LP1911 | | | 1 |
| 8 | N/A | 506150007700R | PALLET,L1110xW1080xH120mm,LP1911 | | | 0.031 |
| 9 | N/A | 506039004500R | CORNER PAPER,2060x50x50xT5mm,LE1708 ROHS | | | 0.125 |
| 10 | N/A | 506039005000R | CORNER PAPER,870x50x50xT5mm,ROHS LE1918 | | | 0.125 |
| 11 | N/A | 506038004700R | CARDBOARD,L1110xW1080xT4mm ROHS LP1911 | | | 0.063 |
| 12 | N/A | 506391000040R | LABEL,POP,FOR BELZE, LP1911 | | | 1 |
| 13 | N/A | 506440002400R | LABEL,BLANK,50x25mm,LE1709(S/N) | | | 1 |
| 14 | N/A | 506250011600R | LABEL,AGENCY,ViewSonic(VX1945),LP1911 | | | 1 |
| 15 | N/A | 506390210400R | LABEL,CARTON(5ms),L89xW58 LE1941 | | | 1 |
| 16 | N/A | 506440002300R | LABEL,BLANK,76.2x76.2mm,LE1709(UPC) | | | 1 |
| 17 | N/A | 506440002600R | LABEL,BLANK,210x65mm,LE1709(PALLET) | | | 0.063 |
| 18 | N/A | 506390000600R | LABEL,HI-POT PASS, LE1709 | | | 1 |
| 19 | CB-00008002 | 453030300120R | CABLE,AUDIO 1P 6FT BLACK/GREEN CP03B06P0 | | | 1 |
| 20 | CB-00008070 | 453030300180R | CABLE,DVI-D 18+1P MALE 6FT PC99(BLACK)SA | | | 1 |
| 21 | CB-00008009 | 453010100150R | CABLE,D-SUB 15P MALE 6FT BLACK,SZ4120955 | | | 1 |
| 22 | A-00006679 | 453070800250R | PWR CORD 10A/125V BLK 6FT UL/CSA,SVT 18x | | | 1 |
| 23 | CB-00008074 | 453030300310R | CABLE,AUDIO 1P TO 2P 6FT,RoHS | | | 1 |
| 24 | CB-00008075 | 453030300320R | CABLE,USB 5FT BLACK, RoHS | | | 1 |
| 25 | A-00008069 | 704300000250R | KIT,POWER ADAPTER FOR BASE LP1911(US&TW) | | | 1 |
| 26 | A-00008071 | 704300000300R | KIT,IPOD ADAPTER FOR BASE LP1911 | | | 1 |
| 27 | N/A | 703000004410R | KIT, ACCESSORY(US),LP1911(VX1945) | | | 1 |
| 28 | N/A | 714078660010R | ASSY,FINAL(B,V0/G1,2,3),W/SPK,LP1911-612 | | | 1 |
| 29 | N/A | 714078660010R | ASSY,FINAL(B,V0/G1,2,3),W/SPK,LP1911-612 | | | 1 |
| 30 | N/A | 509112308100R | SCREW,P,CROSS,T.T-3*8,Zn ROHS REV:A | | | 2 |
| 31 | N/A | 509116608510R | SCREW,P,CROSS,M4*8,BLACK,NL(NYLOK) | | | 4 |
| 32 | N/A | 509112310100R | SCREW,P,CROSS,T.T-3*10,Zn | | | 1 |
| 33 | N/A | 503040000310R | RUBBER,COVER(B), LE1534 | | | 4 |
| 34 | HW-00008055 | 501020210460R | COVER,HINGE-L,VX1945, LP1911 | | | 1 |
| 35 | HW-00008056 | 501020210560R | COVER,HINGE-R,VX1945, LP1911 | | | 1 |
| 36 | E-00008137 | 618100200120R | SPEAKER 2.0W 8Ω 370mm, R/G/B W/CASE | | | 1 |
| 37 | C-00006106 | 714010008500R | ASSY,STAND VX1945 LP1911 | | | 1 |
| 38 | C-00008190 | 714030007910R | ASSY,BEZEL, LP1909 | | | 1 |
| 39 | C-00008191 | 714050007910R | ASSY,BACK COVER, LP1909 | | | 1 |
| 40 | N/A | 714078661000R | ASSY,PANEL(V0/G1&2&3),W/SPK,LP1909-6I2 | | | 1 |
| 41 | C-00008190 | 714030007910R | ASSY,BEZEL, LP1909 | | | 1 |
| 42 | N/A | 501010208310R | BEZEL, LP1909 | | | 1 |
| 43 | N/A | 501030205010R | BUTTON,FUNCTION KEY, LP1909 | | | 1 |
| 44 | N/A | 501120104910R | LENS, LP1909 | | | 1 |
| 45 | N/A | 506102000400R | LOGO PLATE,VIEWSONIC, LE1709(THREE BIRDS | | | 1 |
| 46 | N/A | 506102000300R | LOGO PLATE,VIEWSONIC, LE1709 | | | 1 |
| 47 | N/A | 506431003400R | FILM,PROTECTION,FOR BEZEL-TOP LP1909 | | | 1 |
| 48 | N/A | 506431003410R | FILM,PROTECTION,FOR BEZEL-MIDDLE LP1909 | | | 2 |
| 49 | N/A | 506431003420R | FILM,PROTECTION,FOR BEZEL-BOTTOM LP1909 | | | 1 |
| 50 | N/A | 506390500100R | LABEL,ENERGY STAR, LE1709 | | | 1 |
| 51 | C-00008191 | 714050007910R | ASSY,BACK COVER, LP1909 | | | 1 |
| 52 | N/A | 501020210210R | COVER,BACK, LP1909 | | | 1 |
| 53 | N/A | 506430300003R | FILM,PET,L115xW30xT0.05mm, LE1741 | | | 1 |
| 54 | N/A | 714078661000R | ASSY,PANEL(V0/G1&2&3),W/SPK,LP1909-6I2 | | | 1 |
| 55 | HW-00005270 | 509000000700R | BOLT,#4-40x11.8,Ni FOR D-SUB/DVI CONN.RO | | | 4 |
| 56 | N/A | 509146304200R | SCREW,P,CROSS,W/WAS,M3*4,Zn-Cc,ROHS | | | 4 |
| 57 | HW-00005269 | 509146305300R | SCREW,PW,CROSS,W/WAS,M3*5,NI | | | 4 |
| 58 | N/A | 509146306102R | SCREW,P,CROSS W/W-SPR,M3*6,Zn,ROHS | | | 1 |
| 59 | E-00008016 | 631102090600R | LCD PANEL 19" MT190AW01-V0,AM19000040 | | | 1 |
| 60 | E-00008171 | 631102090610R | LCD PANEL 19" Substitute 1 | | | 1 |
| 61 | E-00008172 | 631102090720R | LCD PANEL 19" Substitute 2 | | | 1 |
| 62 | B-00008169 | 790741300600R | PCBA,I/F BOARD, LP1909-612 | | | 1 |
| 63 | B-00008170 | 790741500000R | PCBA,KEYPAD BOARD, LP1909 | | | 1 |
| 64 | B-00008171 | 790741400600R | PCBA,P/I BOARD, LP1909-612 | | | 1 |
| 65 | CB-00008071 | 430303000690R | HRN LVDS FFC 30P 158mm, ROHS | | | 1 |
| 66 | CB-00008072 | 430300800800R | HRN ASS'Y 8P 200mm UL1571#28 ROHS | | | 1 |
| 67 | N/A | 701000002300R | ASSY,CHASSIS, LP1909 | | | 1 |
| 68 | N/A | 701000002300R | ASSY,CHASSIS, LP1909 | | | 1 |
| 69 | N/A | 502090304510R | CHASSIS, LP1909 | | | 1 |
| 70 | N/A | 502080000110R | SUPPORT,HINGE, LP1909 | | | 1 |
| 71 | N/A | 509116606510R | SCREW,P,CROSS,M4*6,BLACK,NL ROHS (NYLOK) | | | 2 |
| 72 | N/A | 505040503100R | INSULATOR,PP,22x20x12X0.3mm,GLUE(3M), LE | | | 1 |
| 73 | N/A | 505040503400R | INSULATOR,PP,10x15x10X0.3mm,GLUE(3M), LE | | | 3 |

## 8. Exploded Diagram and Exploded Parts List



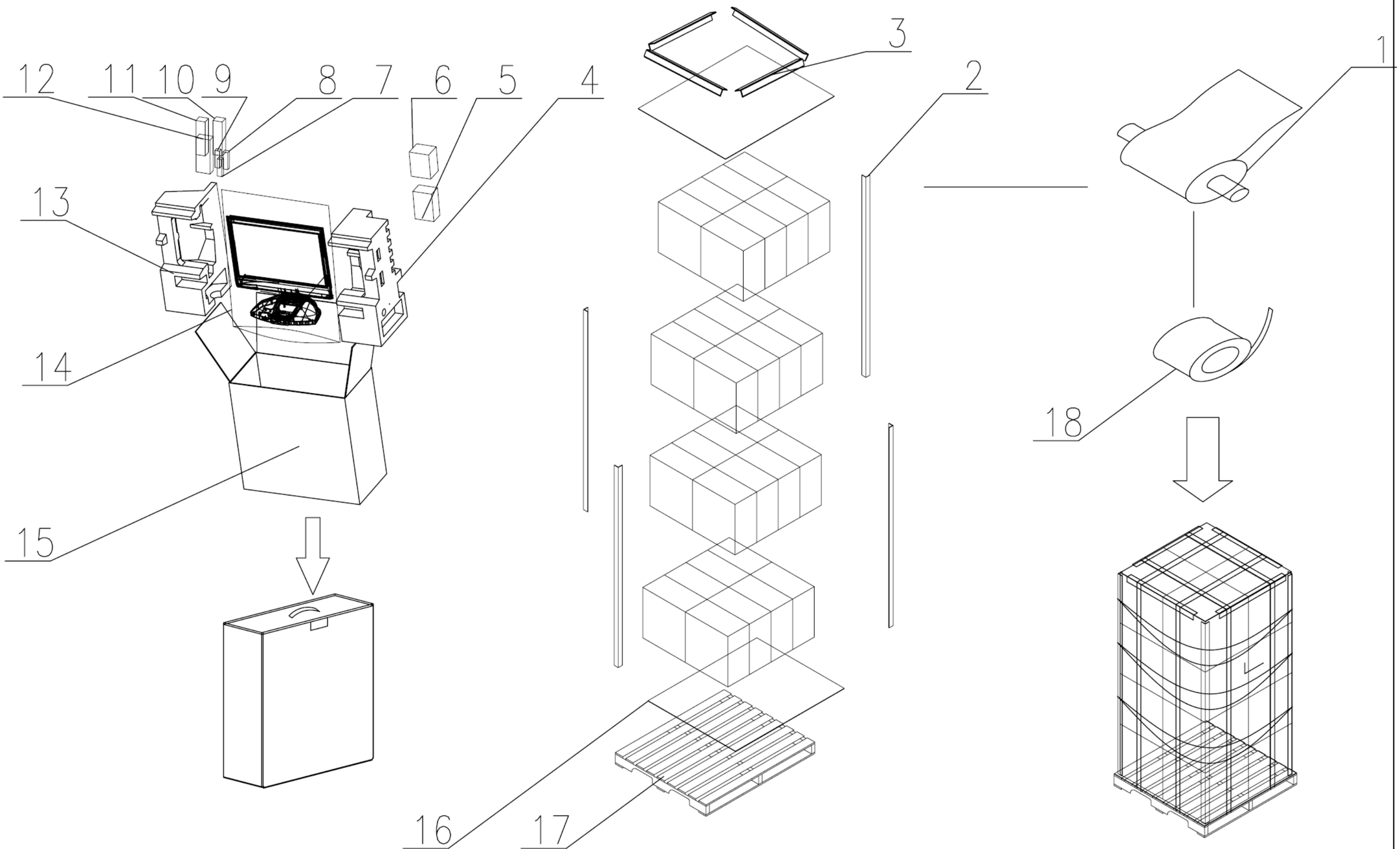
# EXPLODED PARTS LIST (VX1945wm-3)

**ViewSonic Model Number: VS11444**

**Rev: 1b**

**Serial No. Prefix: QCY**

| Item | ViewSonic P/N | Ref. P/N | Description | Q'ty |
|---|---|---|---|---|
| 1 | C-00008190 | 714030007910R | ASSY, BEZEL,LP1909 | 1 |
| 2 | E-00008016 | 631102090600R | LCD PANEL 19" MT190AW01-V0-G1,AM19000040 | 1 |
| 3 | B-00008171 | 790741400600R | PCBA,P/I BOARD, LP1909-612 | 1 |
| 4 | B-00008169 | 790741300600R | PCBA,I/F BOARD, LP1909-612 | 1 |
| 5 | CB-00008071 | 430303000690R | HRN LVDS FFC 30P 158mm, ROHS | 1 |
| 6 | N/A | 701000002300R | ASSY, CHASSIS, LP1909 | 1 |
| 7 | N/A | 505040503100R | INSULATOR, PP, 22*20*0.3mm, GLUE(3M) | 1 |
| 8 | N/A | 505040503400R | INSULATOR, PP, 10*15*10*0.3mm, GLUE(4M) | 3 |
| 9 | E-00008137 | 618100200120R | SPEAKER 2.0W 8Ω 370mm, R/G/B W/CASE | 1 |
| 10 | C-00008191 | 714050007910R | ASSY, BACK COVER, LP1909 | 1 |
| 11 | N/A | 503040000310R | RUBBER, COVER,(B),LE1534 | 4 |
| 12 | HW-00008055 | 501020210460R | COVER, HINGE-L,LP1911 | 1 |
| 13 | HW-00008056 | 501020210560R | COVER, HINGE-R,LP1911 | 1 |
| 14 | B-00008170 | 790741500000R | PCBA,KEYPAD BOARD, LP1909 | 1 |
| 15 | CB-00008072 | 430300800800R | HRN ASS'Y 8P 200mm UL1571#28 ROHS | 1 |
| 16 | N/A | 502080000110R | SUPPORT,HINGE,LP1909 | 1 |
| 17 | C-00006106 | 714010008500R | ASSY,STAND VX1945 LP1911 | 1 |
| A | HW-00005269 | 509146305300R | SCREW,PW,CROSS,W/WAS,M3*5,NI | 4 |
| B | HW-00005270 | 509000000700R | BOLT,#4-40*11.8,NI | 4 |
| C | N/A | 509146306102R | SCREW,P,CROSS,W/W-SPR,,M3*6,Zn,ROHS | 1 |
| D | N/A | 509146304200R | SCREW,P,CROSS,W/WAS,M3*4,Zn-Cc,ROHS | 4 |
| E | N/A | 509116608510R | SCREW,P,CROSS,M4*8,BLACK,NL(NYLOK) | 4 |
| F | N/A | 509112308100R | SCREW,P,CROSS,T3*8, Zn | 2 |
| G | N/A | 509112340100R | SCREW,P,CROSS,T,T3*10,Zn,ROHS | 1 |
| H | N/A | 509116606510R | SCREW,P,CROSS,M4*6,BLACK,NL ROHS | 2 |


12
11
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18

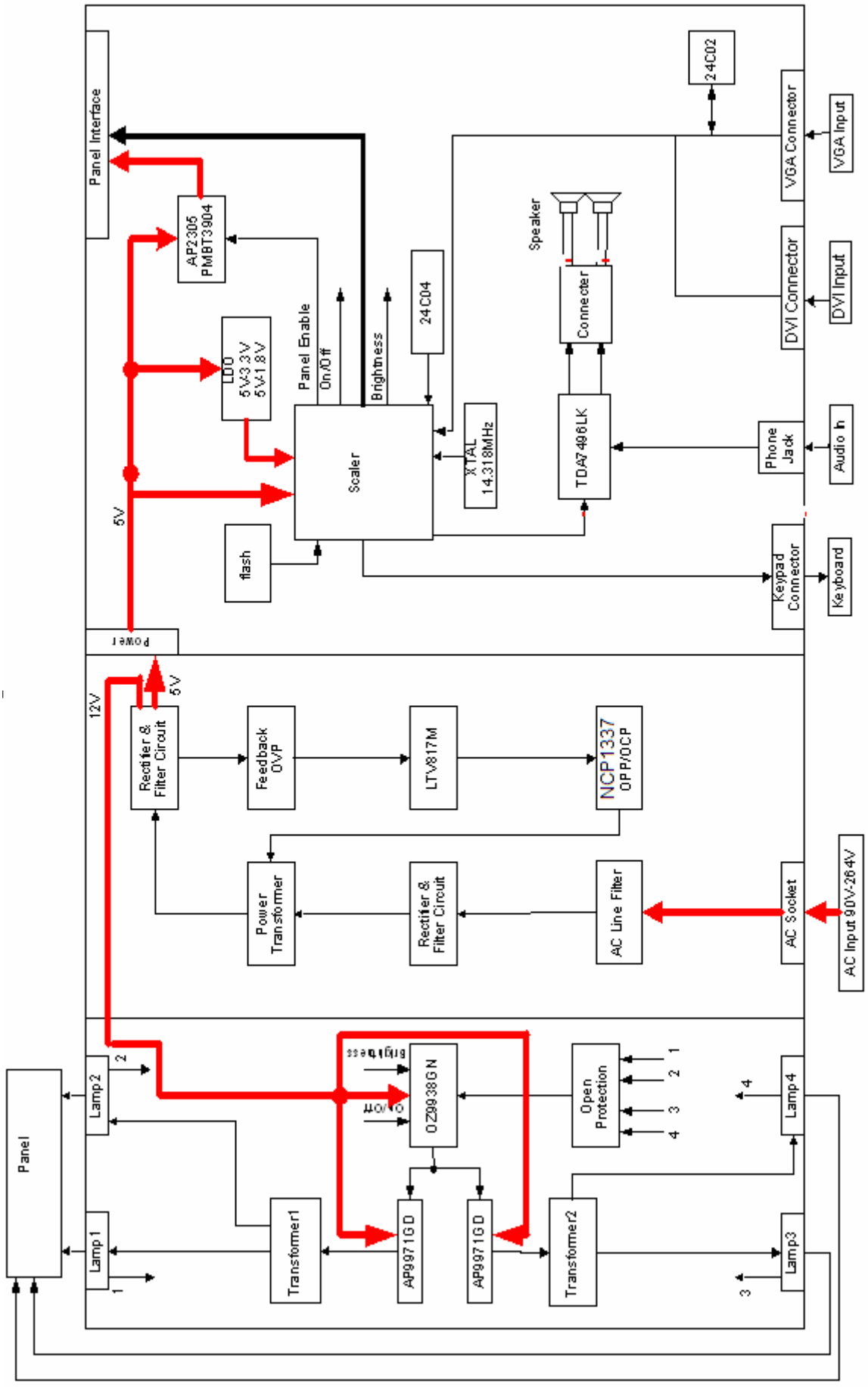
# PACKING PART LIST (VX1945wm-3)

**ViewSonic Model Number: VS11444**

**Rev: 1a**

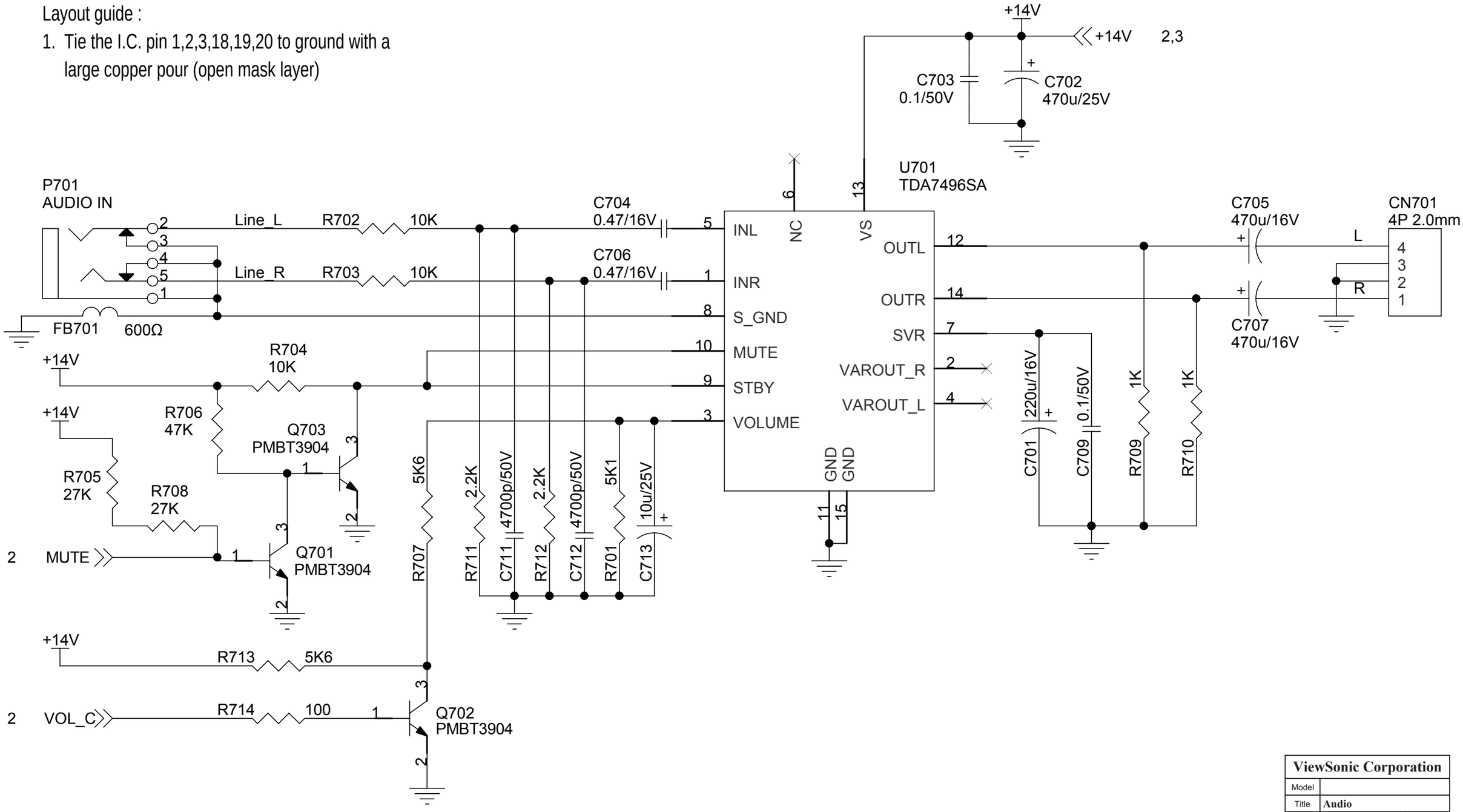
| Item | ViewSonic P/N | Ref. P/N | Location | Q'ty |
|---|---|---|---|---|
| 1 | N/A | 506431000300R | FILM, PE500mm*900M ROHS | 0.0018 |
| 2 | N/A | 506039004600R | CORNER PAPER,2060*50*50*T5mm,LE1712 | 4/32 |
| 3 | N/A | 506039005000R | CORNER PAPER,870*50*50*T5mm, LE1918 | 4/32 |
| 4 | P-00008186 | 506040010130R | CUSHION, EPS-R,VX1945,LP1911 | 1 |
| 5 | A-00008068 | 704300000200R | KIT,POWER ADAPTOR FOR BASE LP1911 | 1 |
| 6 | A-00008071 | 704300000300R | KIT,IPOD ADAPTOR FOR BASE LP1911 | 1 |
| 7 | CB-00008074 | 453030300310R | CABLE,AUDIO 1P TO 2P 6FT,RoHS | 1 |
| 8 | CB-00008075 | 453030300320R | CABLE,USB 5FT BLACK, RoHS | 1 |
| 9 | CB-00008002 | 453030300120R | CABLE,AUDIO 1P 6FT BLACK/GREEN CP03B06P0 | 1 |
| 10 | CB-00008070 | 453030300180R | CABLE,DVI-D 18+1P MALE 6FT PC99(BLACK)SA | 1 |
| 11 | CB-00005254 | 453010100100R | CABLE,D-SUB 15P MALE 6FT BLACK/BLUE,SZ40 | 1 |
| 12 | A-00005255 | 453070800170R | PWRCORD 10A/250V BLK 6FT CHINA.RVV 3Gx0. | 1 |
| 13 | P-00008185 | 506040010120R | CUSHION,EPS-L,VX1945,LP1911 | 1 |
| 14 | P-00008170 | 506120301700R | EPE+PE BAG,L620*W510T0.6mm,LE1925 | 1 |
| 15 | P-00008184 | 506020012510R | CARTON,VIEWSONIC(VX1945),LP1911 | 1 |
| 16 | N/A | 506038004700R | CARDBOARD,L1110*W1080*H120,LP1911 | 2/32 |
| 17 | N/A | 506150007700R | PALLET,L1110*W1080*H120,LP1911 | 1/32 |
| 18 | N/A | 506380002100R | TAPE,WRAPPING TYPE(VIEWSONIC),50mm*75M, LE1708 | 0.03 |

# 9. Block Diagram

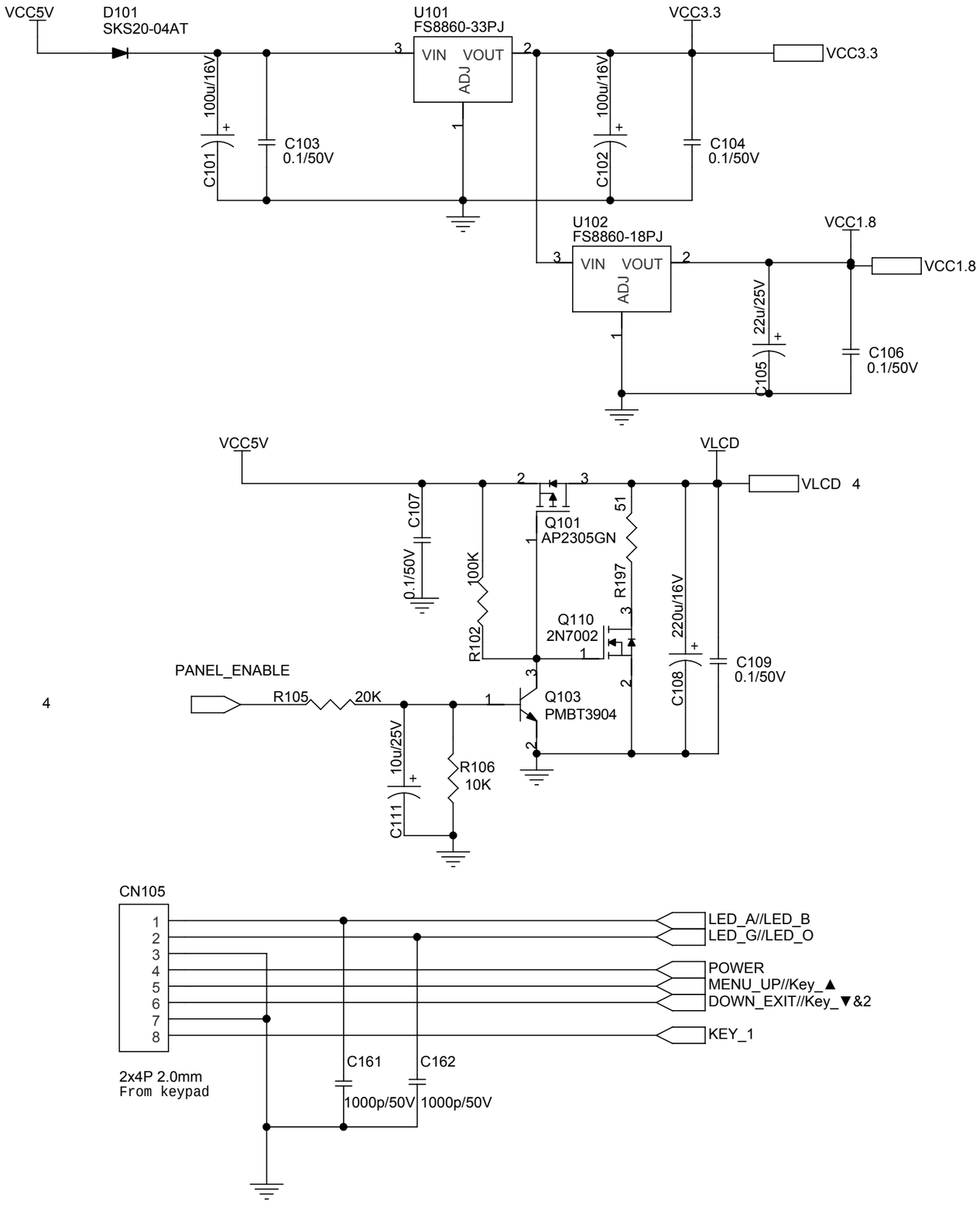


Layout guide :

1. Tie the I.C. pin 1,2,3,18,19,20 to ground with a large copper pour (open mask layer)




| ViewSonic Corporation | | |
|---|---|---|
| Model | | |
| Title | **Audio** | |
| Date | | Rev: |




| ViewSonic Corporation | | |
|---|---|---|
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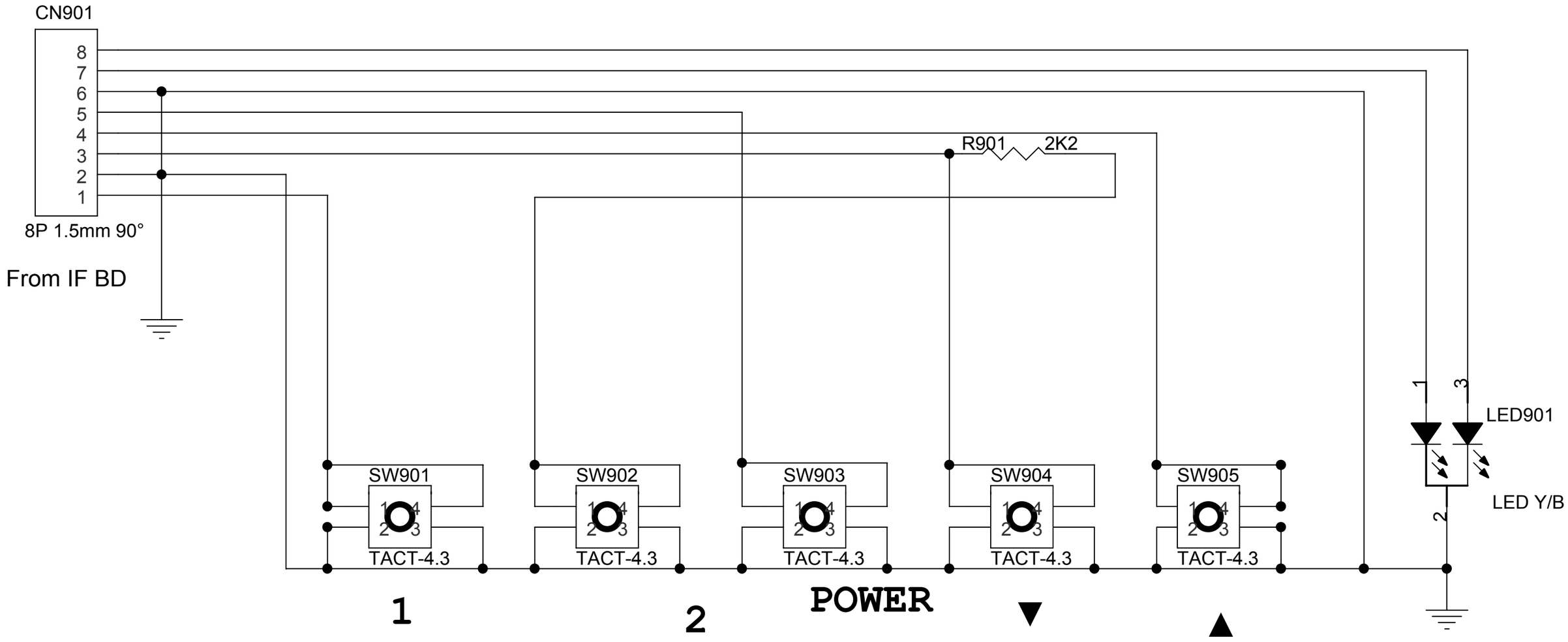
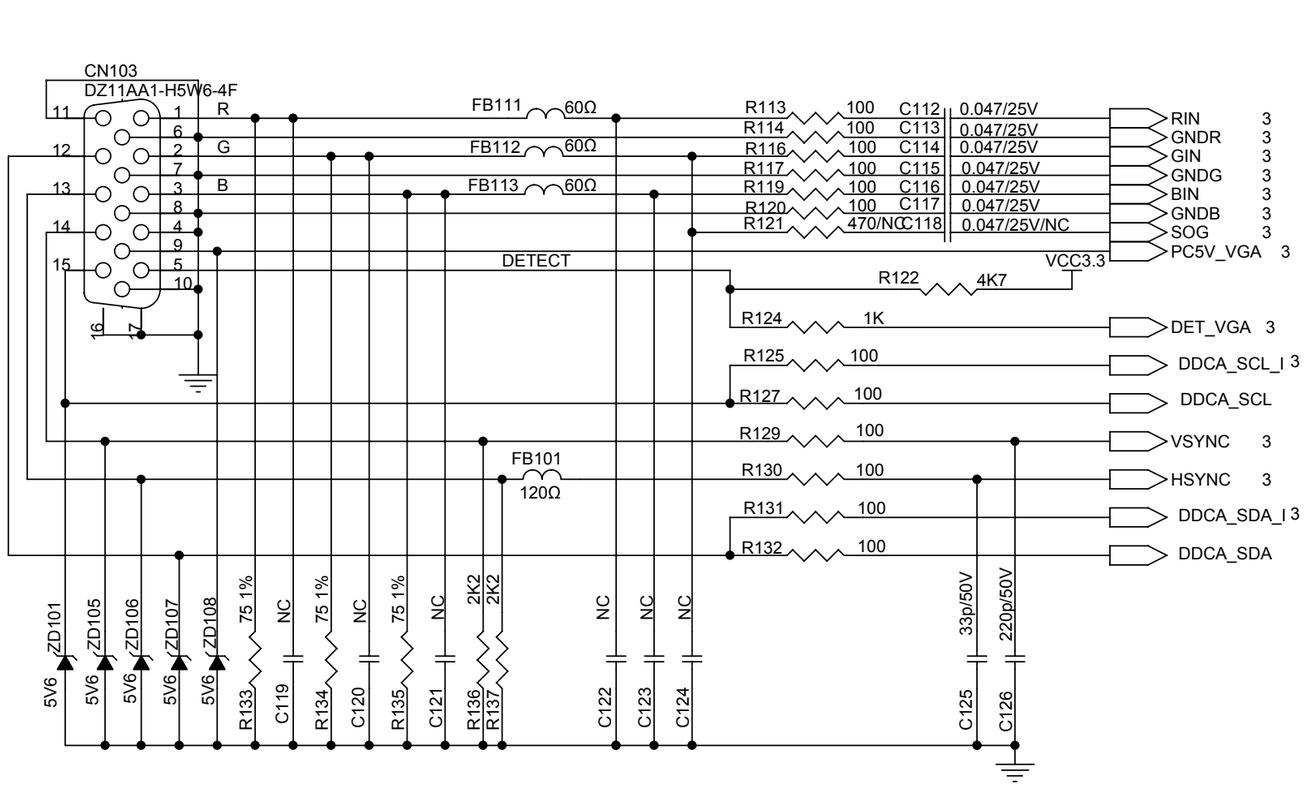
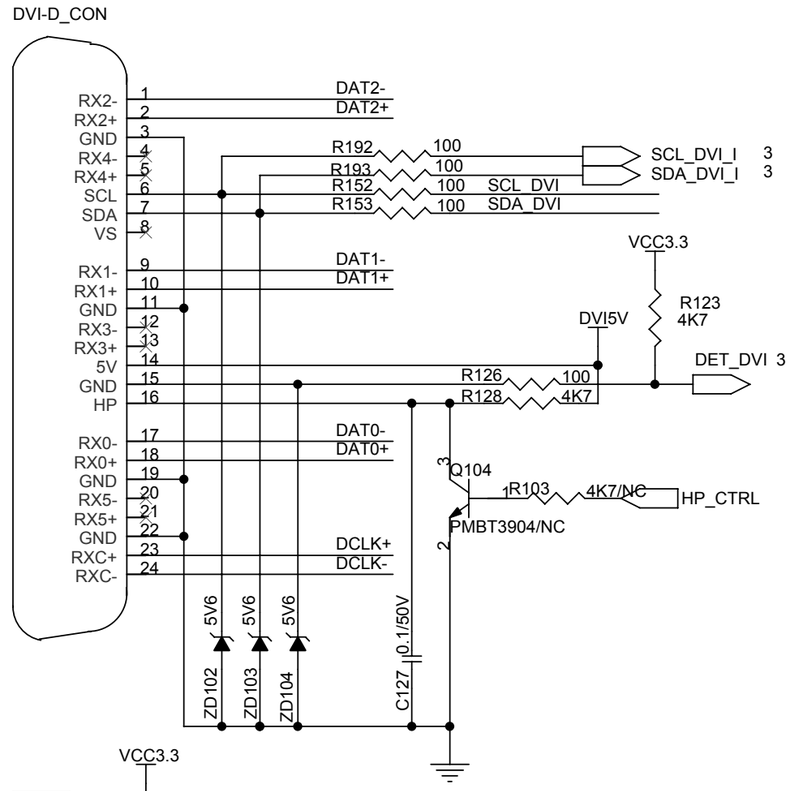
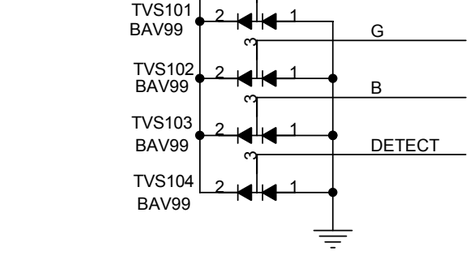
| Title | DC to DC | |
| Date | | Rev: |

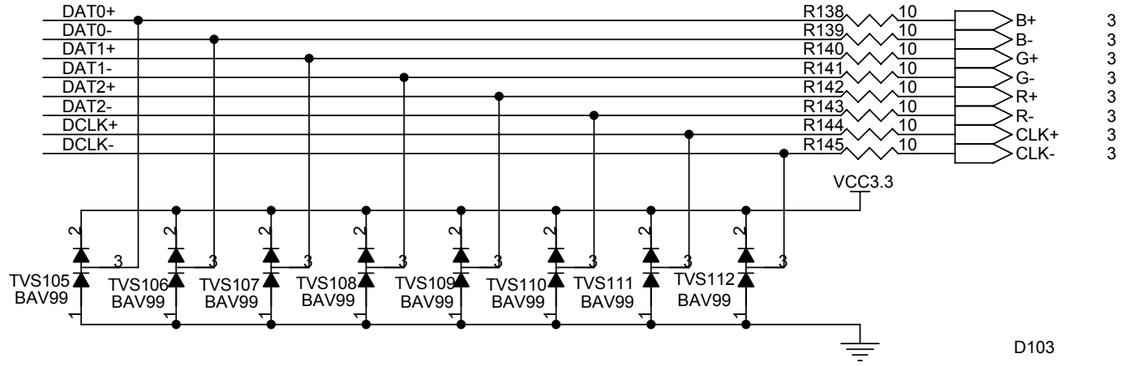


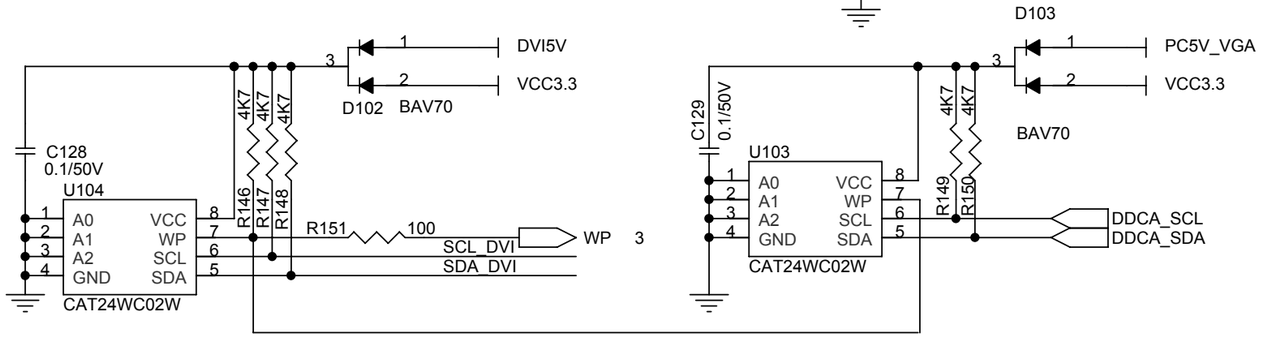

| ViewSonic Corporation | | |
|---|---|---|
| Model | | |
| Title | Keypad | |
| Date | | Rev: |



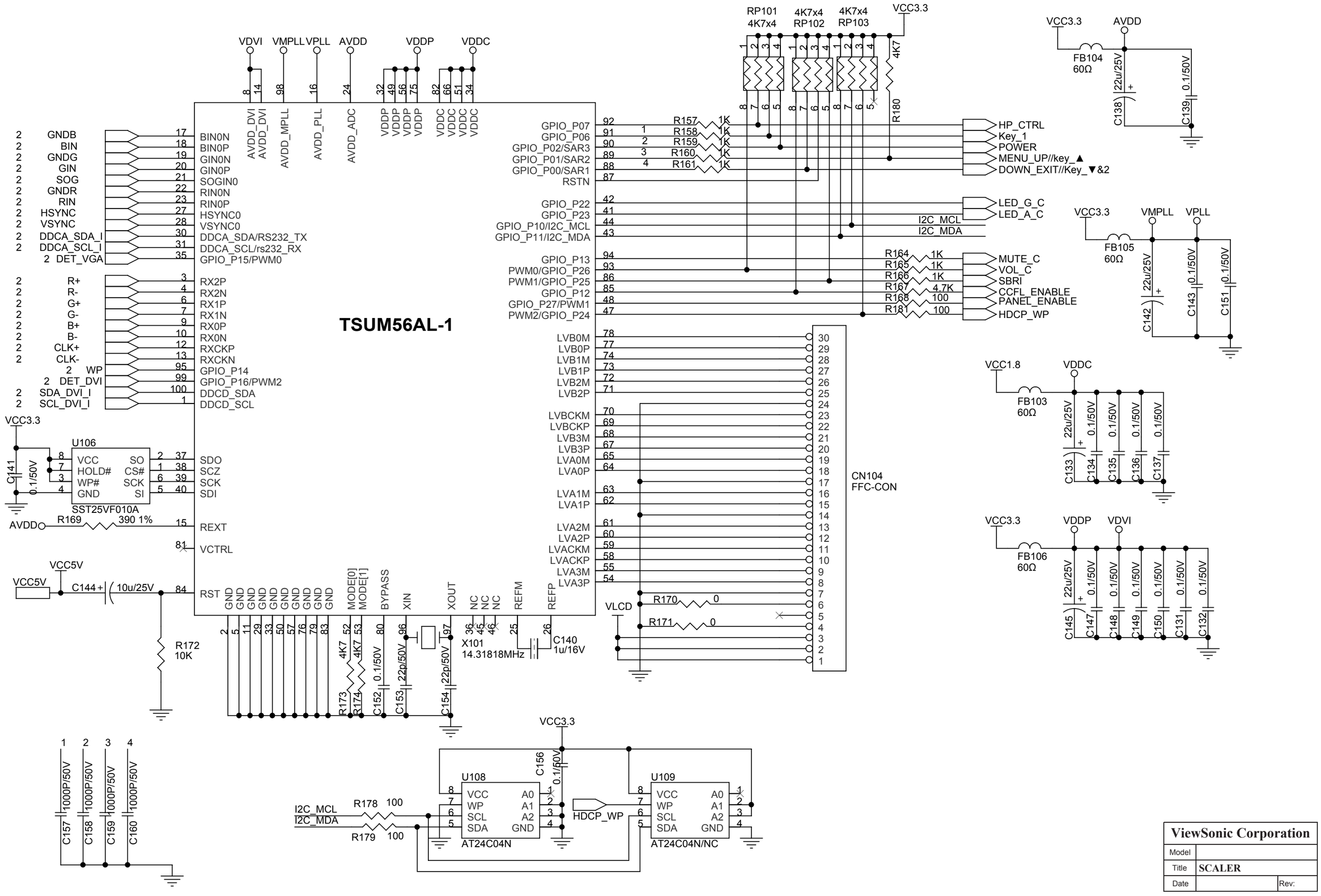







| ViewSonic Corporation | | |
|---|---|---|
| Model | | |
| Title | Input | |
| Date | | Rev: |




| ViewSonic Corporation | | |
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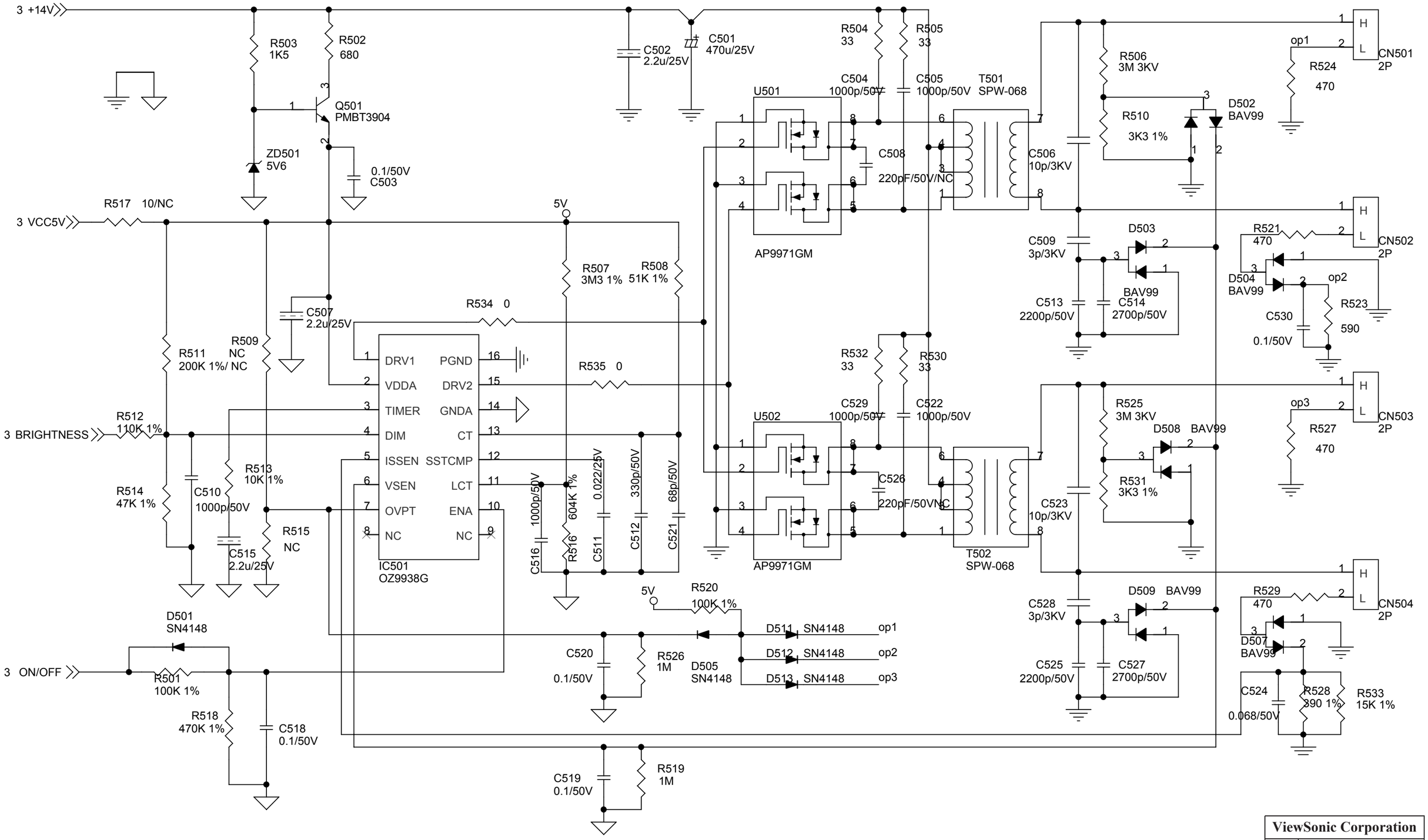


| ViewSonic Corporation | | |
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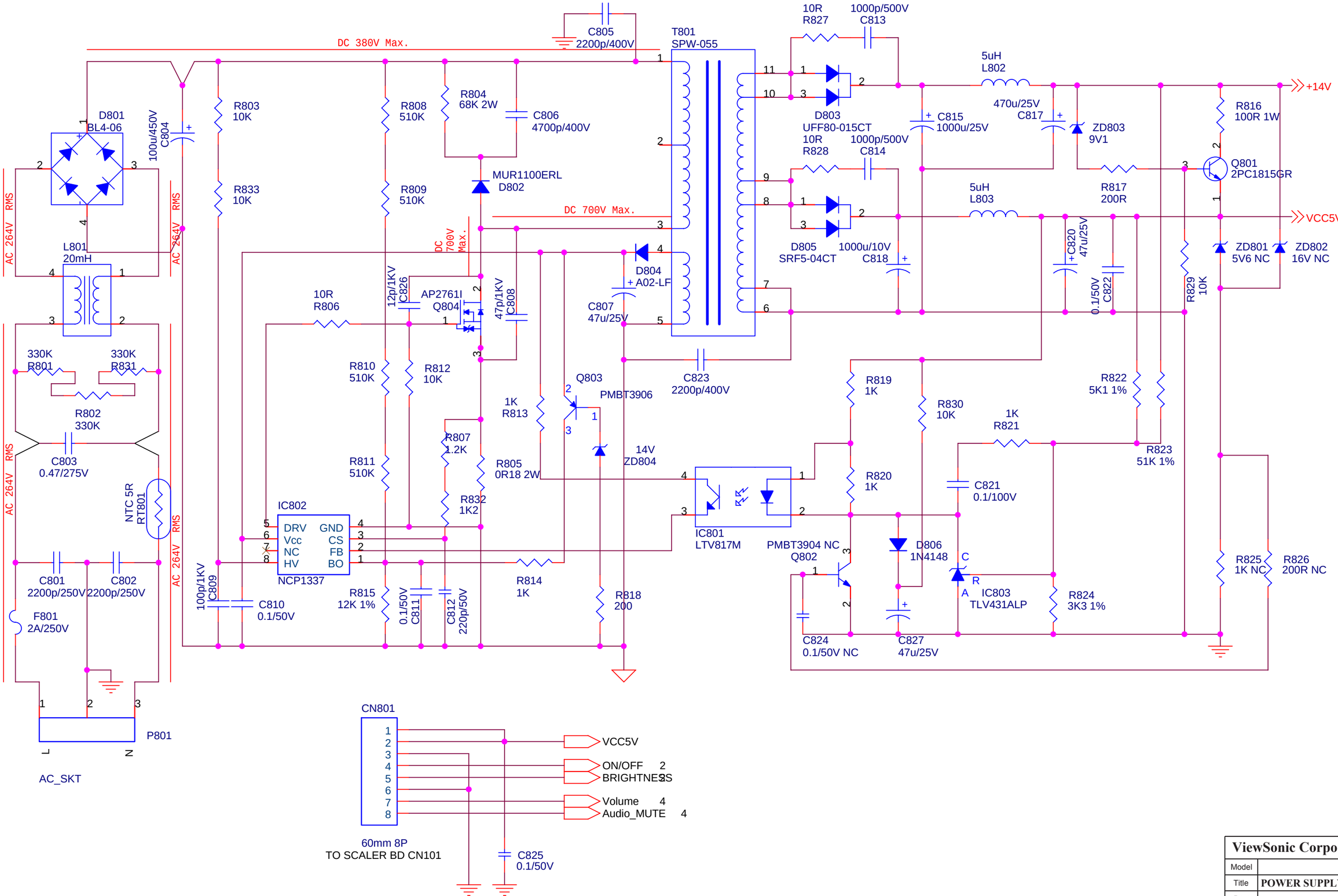
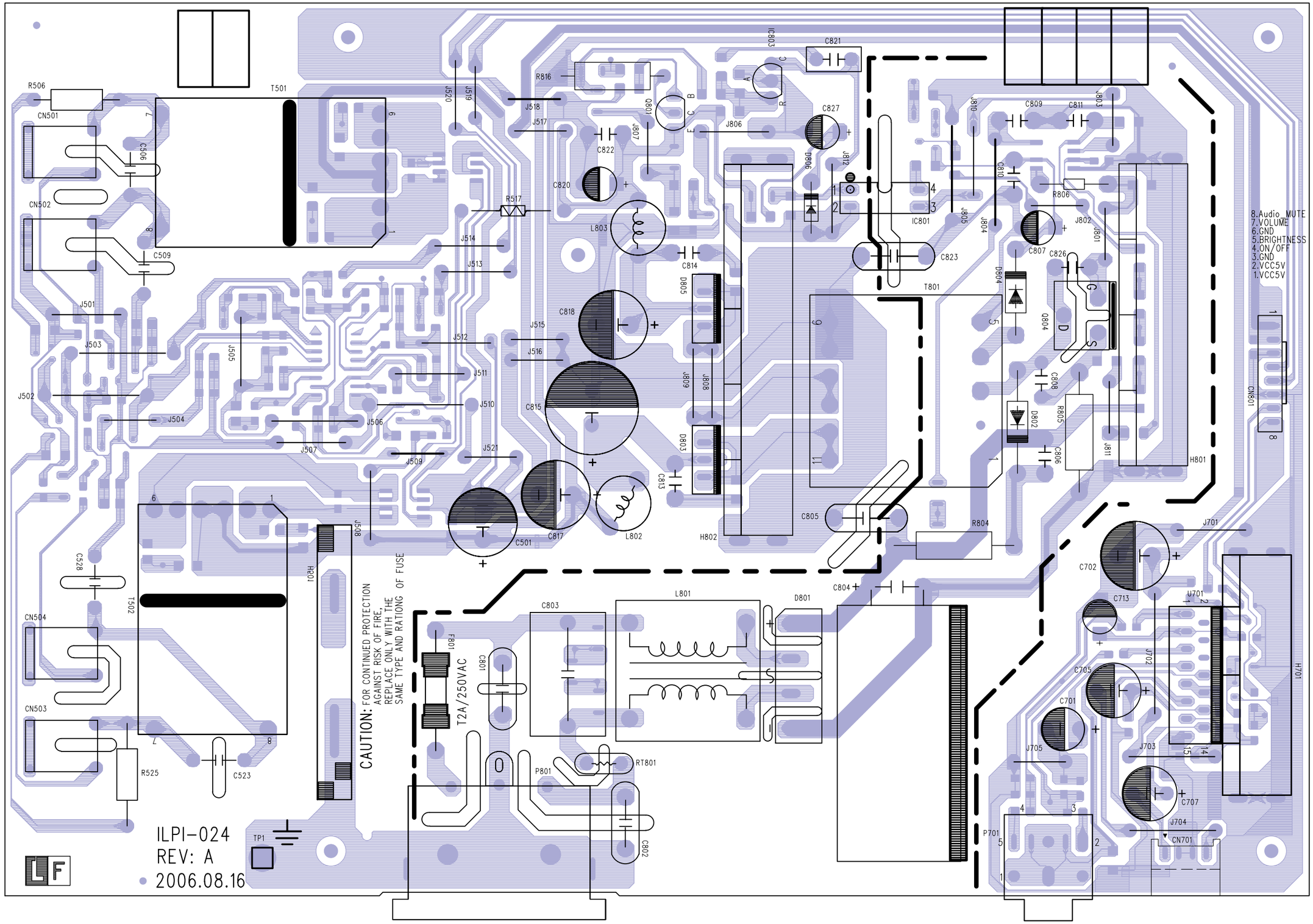
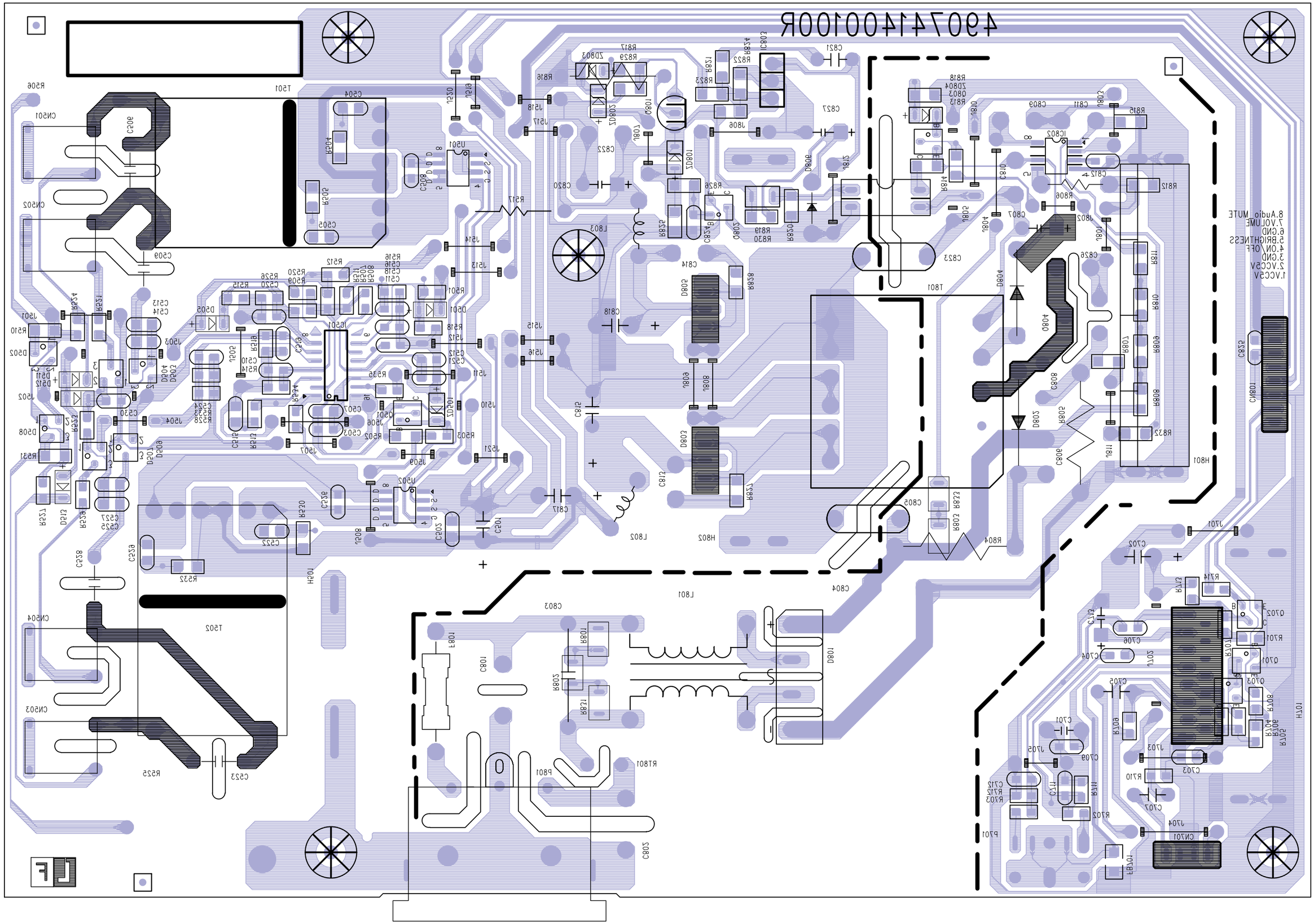
| Date | | Rev: |

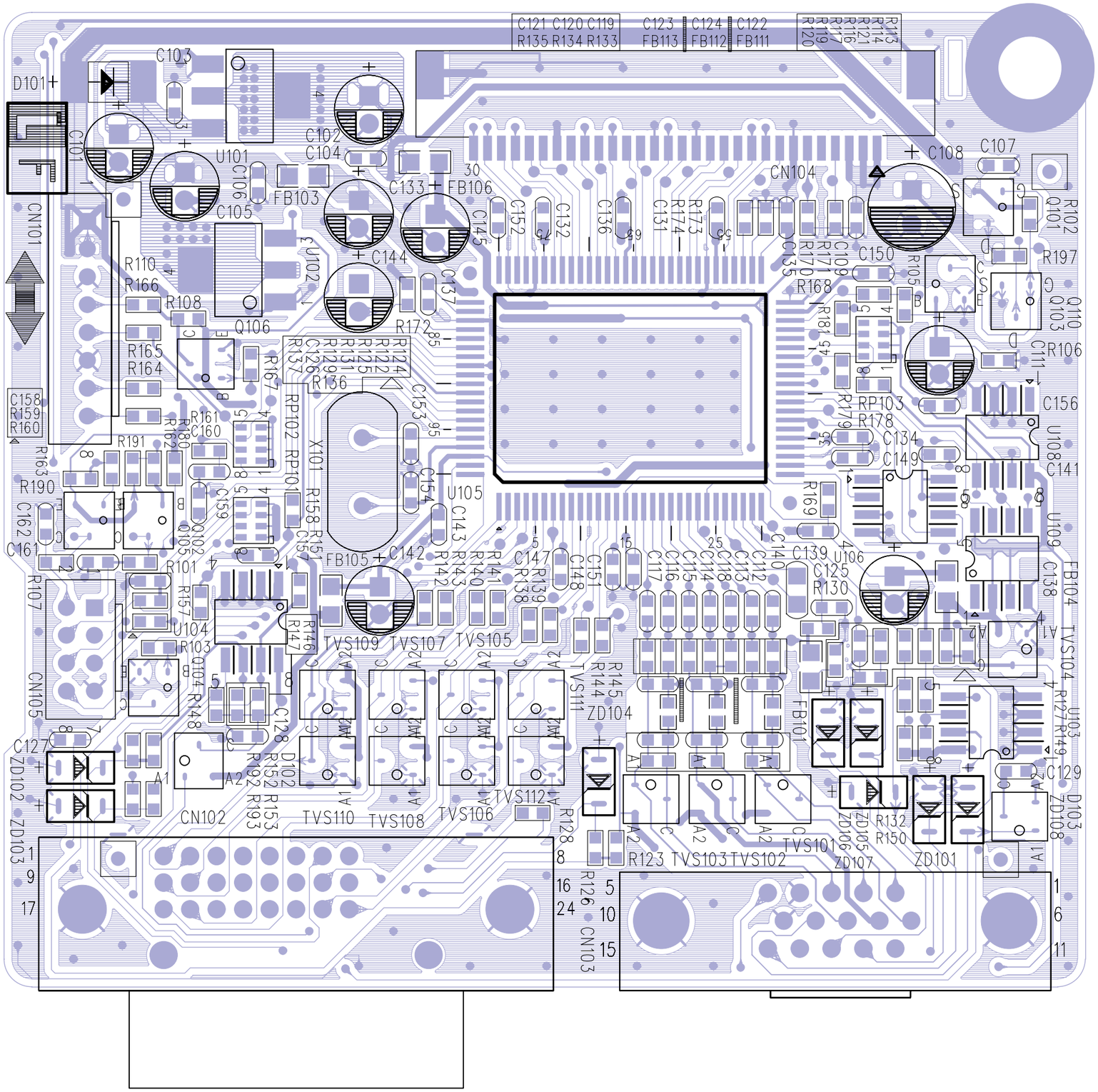



| ViewSonic Corporation | |
|---|---|
| Model | |
| Title | POWER SUPPLY |
| Date | Rev: |

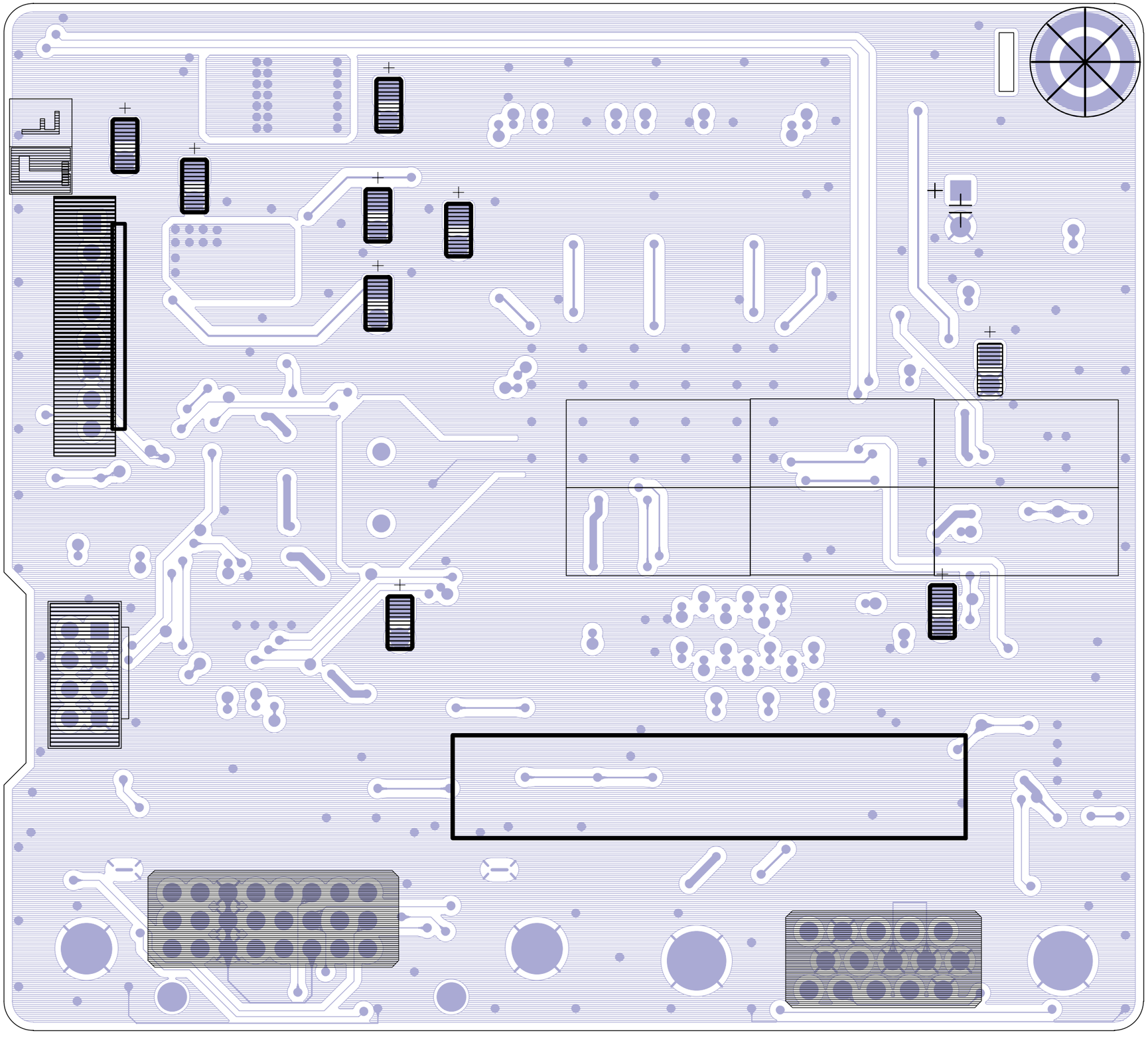

8.Audio_MUTE
7.VOLUME
6.GND
5.BRIGHTNESS
4.ON/OFF
3.GND
2.VCC5V
1.VCC5V
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH THE SAME TYPE AND RATIONG OF FUSE
T2A/250VAC
ILPI-024
REV: A
2006.08.16


4907414001000R
8.Audio_MUTE
7.VOLUME
6.GND
5.BRIGHTNESS
4.ON/OFF
3.GND
2.VCC5V
1.VCC5V

SILKSCREEN TOP



SILKSCREEN BOTTOM



# * Reader's Response*

Dear Readers:

Thank you in advance for your feedback on our Service Manual, which allows continuous improvement of our products. We would appreciate your completion of the Assessment Matrix below, for return to ViewSonic Corporation.

***Assessment***

**A.** What do you think about the content of this Service Manual?

| *Unit* | *Excellent* | *Good* | *Fair* | *Bad* |
|---|---|---|---|---|
| **1. Precautions and Safety Notices** | | | | |
| **2. Specification** | | | | |
| **3. Front Panel Function Control Description** | | | | |
| **4. Circuit Description** | | | | |
| **5. Adjustment Procedure** | | | | |
| **6. Troubleshooting Flow Chart** | | | | |
| **7. Recommended Spare Parts List** | | | | |
| **8. Exploded Diagram and Exploded Parts List** | | | | |
| **9. Block Diagrams** | | | | |
| **10. Schematic Diagrams** | | | | |
| **11.PCB Layout Diagrams** | | | | |

**B.** Are you satisfied with this Service Manual?

| *Item* | *Excellent* | *Good* | *Fair* | *Bad* |
|---|---|---|---|---|
| **1. Service Manual Content** | | | | |
| **2. Service Manual Layout** | | | | |
| **3. The form and listing** | | | | |

**C.** Do you have any other opinions or suggestions regarding this service manual?

***Reader's basic dada:***

| | | | |
|---|---|---|---|
| **Name:** | | **Title:** | |
| **Company:** | | | |
| **Add:** | | | |
| **Tel:** | | **Fax:** | |
| **E-mail:** | | | |

**After completing this form, please return it to ViewSonic Quality Assurance in the USA at facsimile 1-909-839-7943. You may also e-mail any suggestions to the Director, Quality Systems & Processes (marc.maupin@viewsonic.com)**